UPSTREAM:

HOW THEORY SHAPES THE SELECTION OF WAYS IN STRATEGY

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ABSTRACT

This study is a historical analysis of how theory becomes strategy. While we know theory relates to strategy somehow, this relationship has not been comprehensively modeled for students and practitioners who must guess about how to win from one context to the next. Guessing in war demands the use of theory for conjecturing about what to do. The role of theory in practicing the art of war is particularly critical since war provides little or no opportunity for hypothesis testing before life and death is upon the strategist, statesman, warrior, and civilian. This analysis looks at strategy development across four theories of action from two different eras—two from World War II and two from the post-Cold War era. One cannot say how much theory determined the outcome of events in each case. However, the peculiar force of theory is always present and follows a general model where four levels of theory combine to provide concepts and logic that guide strategy development in accordance with the changing character of war. Each level entails various propositions and assumptions that combine into an argument about how to win.

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Portions of the introduction, chapters 2 through 5, and the conclusion chapter previously appeared in "Strength in Ways: Finding Creativity in Routine Strategy Development," (Maxwell AFB, AL: School of Advanced Air and Spacepower Studies, 2010). Appendix 1 was co-created by the author, previously posted on the SAASS Wikia website, and is reprinted here with permission from the other author, Lt Col Sugar Lyle. Appendix 2 was created by the author and previously posted on the SAASS Wikia website. Portions of chapter 6 on Thomas Kuhn mirrors language of the introductory paragraph to Thomas Kuhn's *Structure of Scientific Revolutions* entry on Wikipedia as the author drafted parts of that section between February 2011 and October 2013.

CHAPTER 1
INTRODUCTION

> *Victory smiles upon those who anticipate changes in the character of war.*
>
> – Douhet,
> *The Command of the Air*, 1921

The power of ideas is central to the story of military strategy since winning often requires creativity and theoretical change. Great examples of this phenomena can be found across history. Outnumbered about 300-to-1, Spartan King Leonidas had to determine how to counter the largest military invasion his world had ever known.[1] He theorized how the Greeks could make the Persian masses "count as none" using geography.[2] He found a way to use the narrow "Hot Gates" at Thermopylae to force the Persians to both fight in smaller numbers and fight according to Spartan tactics. While the Spartans and their allies died there to the last man, Thermopylae fueled enough national courage to defeat Persia the next year at Plataea in 479 BC. The tactical excellence of his guess in an impossible situation had lasting strategic impact on Greece as a whole.[3]

On September 11, 1297, the Scottish infantry under William Wallace faced a cavalry attack at the Battle of Stirling Bridge. The moment for battlefield strategy was upon Wallace. To win, he theorized how the Scots could negate the mobility of the

[1] The Persian amphibious invasion of Greece in 480 B.C. was the largest in human history until D-Day, June 6, 1944.
[2] Herodotus, Robert B. Strassler, and Andrea L. Purvis, *The Landmark Herodotus: The Histories*, 1st ed. (New York: Pantheon Books, 2007), 573, 7.177.
[3] Herodotus, *The Histories*, 591, 684. We are told Leonidas considered this stand a way to gain a future for Sparta (7.220.2-4). Later we see post-Thermopylae nationalism raises a Greek army at Plataea and we can infer that the legend of Thermopylae was some boon (9.38.2).

English horses led by the arrogant Sir Hugh de Cressingham. The Scots would wait until a critical mass of English cavalry and infantry charged over Stirling Bridge—the main route into Scotland. Then, Wallace would order the bridge to be surprisingly disabled--but not destroyed--by an engineered pin-and-roller innovation underneath the bridge abutment.[4] Finally, a hidden regiment of 2,000 Scottish spearmen would surround the English horsemen and infantry who were isolated on the Scotland side of the bridge, thus creating a confined battle space where the horses could not move (see "The Battle of Stirling Bridge" by Andy Hillhouse). The English crossed with about 5,400 men. Wallace then blew a horn, the carpenter John "Pin" Wright knocked out the bridge pin on command, and the trap was set.[5] Those on the bridge were cast into the river. The English horsemen trapped on the Scottish side realized they had been fooled. The infantry stuck in England on their side of the bridge realized they were cut off from the fight and helplessly watched Cressingham's men slaughtered as the hidden reserve of Scot's poured into the trap. Wallace's creative hypothesis destroyed the myth of British invincibility and marked a turn in the long road toward Scottish equality. This battle may have also been the first time in history that an infantry defeated a cavalry head on at such a scale.

[4] The Stirling Smith Art Gallery and Museum, "The Good John Wright," panel, accessed 21 May 2009, Stirling, Scotland. There are competing histories of who disabled the bridge and how it happened. Evidence that it was part of Wallace's plan includes the following. The cleverest craftsman in Stirling, the Good John Wright, created the makeshift pin structure used to knock out the bridge. There are five sources to support his role. First, John Wright was renamed "Pin" Wright after his dramatic part in the battle. Second, every first-born male descending from this Wright family was forever named "Pin". This lasted until 1900 when the last of the living Pin Wrights died as recorded in a Stirling obituary. Third, there are three fields near Stirling that are named "The Pin Wright Fields" to this day. Fourth, John Wright's engineering feat is recorded in Blind Harry's account of Wallace. Finally, the account of John "Pin" Wright aligns with the oral traditions of Stirling. Blind Harry's account by itself is what can be discredited in the absence of the corroborating evidence about this history of John "Pin" Wright.

[5] William Hamilton, *The History of the Life and Adventures and Heroic Actions of the Renowned Sir William Wallace* (Kilmarnock: Air (printed by John and Peter Wilson), 1799), 124-126.

On another September 11th, the power of ideas was demonstrated against us on U.S. soil. Nineteen men armed *with plastic box cutters* turned four U.S. airliners into guided missiles. Al Qaida's hypothesis was creative: attack across American centers of gravity simultaneously using our own planes and their (suicidal) pilots to initiate a protracted war. Al Qaida found a way to alter the political and military landscape of the world with material one could purchase at a hardware store. It was a treacherous slaughter of innocent non-combatants. Unfortunately, it was also a dramatic example of the power of ideas at work in creating strategy.

Thermopylae, Stirling Bridge and 9/11 illustrate how the esoteric realm of theory suddenly becomes concrete. The problem is while we know theory relates to strategy somehow, this relationship has not been comprehensively modeled for students and practitioners. The critical path from the power of ideas to strategy is still too mysterious. Strategy involves guessing. However, guessing in war demands the use of theory in conjecturing about what to do and that simple truth has not received the attention it deserves. Strategy students also lack a framework for bounding all of the relevant literature that will supplement their experiences to make them strong strategists. This same framework-void places the burden on strategy students to figure out why books as diverse as Thomas Kuhn's *Structure of Scientific Revolutions* and Clay Shirky's *Here Comes Everybody* actually apply to their craft when it comes time to guess about how to win. For practitioners, the theory-to-strategy connection is too vague to routinely exploit in the "real world." All combined, theory fails to receive acknowledgement as a key ingredient in gaining asymmetric advantage over our enemies and clarifying the relationship between theory and strategy starts at the fundamental nature of both.

At its core, strategy is always a guess because it involves the future.[6] The general subject of guessing well *pervades* the classics. Thinkers like Plato, Aristotle, Hippocrates, Copernicus, Aquinas, Bacon, Pascal, Descartes, Newton, Locke, and Kant all devoted time to understanding this skill called hypothesizing.[7] However, the connection between hypothesis and strategy development is still tacit and vague.

When building a hypothesis, theory plays a fundamental role by providing the logic for conjecture about how the world works or what should be done from one context to the next. This is why Colin Gray rightly noted, "Nearly everything that impinges upon issues of war and peace comes down to applied theory."[8] The role of theory in practicing the art of war is particularly critical since war provides little or no opportunity for hypothesis testing before life and death is upon the strategist, statesman, warrior, and civilian. From this vantage of strategy as a guess, theory should be embraced as a gymnasium for the mind to prepare for "the higher realms of action."[9] Often this is not the case. At best, U.S. officers tend to view theory as dry, at worst, irrelevant. One reason may be the power of theory in strategy has not been plainly modeled in a manner that demonstrates its peculiar force in the times of our greatest need.

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[6] Barry Watts, "Barriers to Acting Strategically: Why Strategy is So Difficult," in *Competitive Strategies for the 21st Century: Theory, History, and Practice*, ed., Thomas G. Mahnken (Standford: Stanford University Press, 2012), 53. "In the end, strategies are guesses about how the unpredictable future will unfold after the strategist has chosen and implemented a given course of action to address a major problem."

[7] Mortimer J. Adler, ed. *Synopticon for the Great Books of the Western World* (Chicago: Encyclopedia Britannica, Inc., 1990), 576-587.

[8] Colin Gray, *The Strategy Bridge: Theory for Practice* (New York: Oxford University Press, 2010), 22.

[9] Carl von Clausewitz, *On War*, 578. "Theory cannot equip the mind with formulas for solving problems, nor can it mark the narrow path on which the sole solution is supposed to lie by planting a hedge of principles on either side. But it can give the mind insight into the great mass of phenomena and of their relationships, then leave it free to rise into the higher realms of action. There the mind can use its innate talent to capacity, combining them all so as to seize on what is right and true as though this were a single idea formed by their concentrated pressure – as though it were a response to the immediate challenge rather than a product of thought."

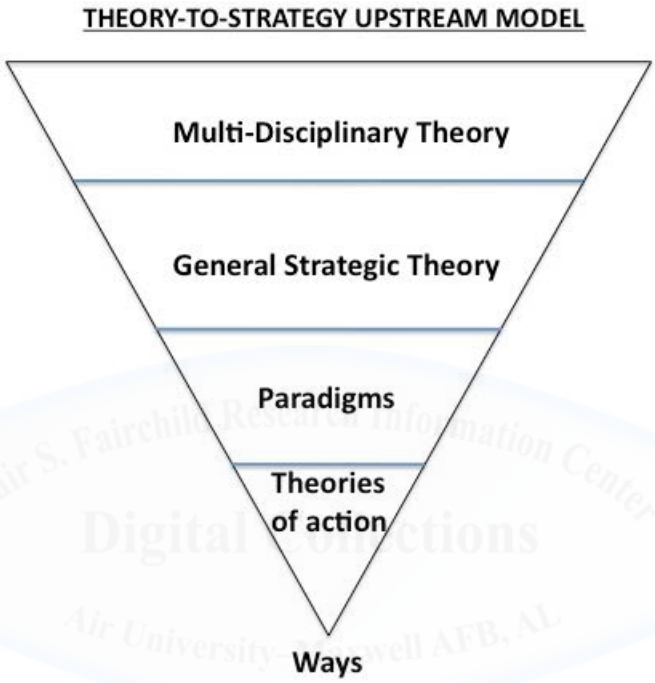
To that end, this thesis attempts to clarify how theory becomes strategy. This requires an explanation and structuring of the theory-strategy nexus. To search for clues, the level of analysis for this research is how theory shaped the selection of ways in strategy development across four different theories of action from two different eras—two from World War II and two from the post-Cold War era. I argue that certain levels of theory combine to provide concepts and logic that guide strategy development in accordance with the changing character of war. Each level entails various premises and assumptions that combine into a working hypothesis about what to do. Sometimes actors trade in theory unaware. Other times, the application of theory is very deliberate. Once strategists see how theory shapes the selection of "ways" in strategy, they are better positioned to guess well when they are thrust into the arena when all is life and death and great consequence.

Defining the four levels of theory is key to explaining how each one shapes the selection of ways. Various sources capture aspects of these levels like the "paradigm" level in Thomas Khun's *Structure of Scientific Revolutions*. Yet more than one level is at play and they need to be combined to understand how theoretical frameworks impact strategy. At the broadest level, *multidisciplinary theory* consists of phenomena beyond the field of strategy itself. *General strategic theory* comprises the constant phenomena found in the nature of war.[10] *Paradigms* are accepted or emerging models of practice. Finally, *theories of action* provide tailored logic to guide the selection of "ways" that solve a specific national security problem (see Figure 1). Those ways become the essence

[10] Clausewitz, *On War*, 71. "[War] deals with matters that no permanent law can provide for. One would agree, and abandon the attempt, were it not for the obvious fact that a whole range of propositions can be demonstrated without difficulty." He follows with examples of timeless propositions and his (unfinished) plans for *On War*.

of strategy. One may connect theories of action to the "theory of the case" in law, or to Peter Drucker's "theory of the business."

Figure 1: Theory-to-Strategy Upstream Model



Regarding the definition of strategy, this work revolves around a theory-based definition like those found in the works of Bernard Brodie, Barry Posen, Eliot Cohen, and Hal Brands (See Appendix 1: Selected Descriptions and Definitions of Strategy). As this research supports, strategy is the theory-based argument for selecting ways in which means are orchestrated to win in a specific context (further discussed in the conclusion).

When viewed together, the four levels of theory provide a general model or structure for understanding how theory provides logic for selecting ways in the strategy formulation process. The model representing these levels of theory is simply called the Upstream Model. The word upstream indicates the scope of this research. i.e. how theory

shapes the selection of ways "upstream" from a finalization—and implementation—of strategy. The model is drawn like a funnel leading to the selection of ways since tacit intellectual commitments to certain theories at each level narrow down the vast range of concepts that end up providing the basis of a strategy (see Table 9, "Theory-to-Strategy Channelization in Afghanistan").

In addition to the central question about how theory shapes the selection of ways in strategy, other questions naturally flow from the model. How do levels of theory actually combine in practice? Are there other contemporary theories of action that follow this model? Does the model apply more broadly to other fields and levels of organization? Are we still in Afghanistan due to theory? Do theoretical frameworks affect the roads *not* taken too and if so, how? How should the power of theory impact how we define, make, and teach strategy?

The narratives in this study also present—unintentionally—alternative ways to frame the cases when viewed through the lens of theory. In World War II for example, the British application of theory cannot be simplified as mass casualty, nighttime-area bombing as evidenced by the daring Dambusters Raid in 1943. Nor did the Americans only use "Industrial Web" precision bombing as evidenced throughout 1945 in Japan. In the case of Operation Desert Storm, a paradigm shift took place that cannot be explained exclusively by new technologies available to the strategists. There is evidence that this new paradigm could have been seen after World War II but it was not. Further, using hindsight from the power vacuum created in the 2003 Iraq War, it is noteworthy how diligent Desert Storm strategists were to apply political science theory about avoiding power vacuums—something they viewed as common sense when selecting ways in

Desert Storm. In the air war over Kosovo, previously classified information offers new insight into a fascinating theory of action called Crony Attack. This new information could challenge the common critique of Operation Allied Force as "excessive gradualism" and view it rather, as a very innovative theory of action that succeeded in one of the most politically constrained military situations in U.S. history. There are also practical implications of the Upstream Model that emerge from these cases ranging from how we define strategy itself to how we make strategy and teach others how to do so.

This rest of this introduction explores a foundation for discussing theory as it pertains to strategy. Section one provides a "big-picture" context for the role of theory in strategy, defines theory, and offers one guiding principle for how the four levels of theory interact. Section two further defines the four levels of theory and explores the meaning of "ways" in strategy—a strategy term that is currently not well defined. Section three examines how the various levels of theory combine to help create a hypothesis. The fourth section notes that theory has limits and analyzes the factors that make "good" or "bad" theory. Altogether, this introduction provides a model that reveals how theory shapes strategy in light of the changing character of war. The introduction closes with background for the World War II and post-Cold War case studies used in this research. These two case studies containing four different theories of action provide the evidence for the operation of this model.

I. The Big Picture: Theory-to-Strategy Nexus

The importance of theory to crafting strategy is understood in general terms. Figure 2 from the National War College curriculum provides a starting point to place

theory in a context. The diagram illustrates the basic learning process that occurs in developing a military strategy.

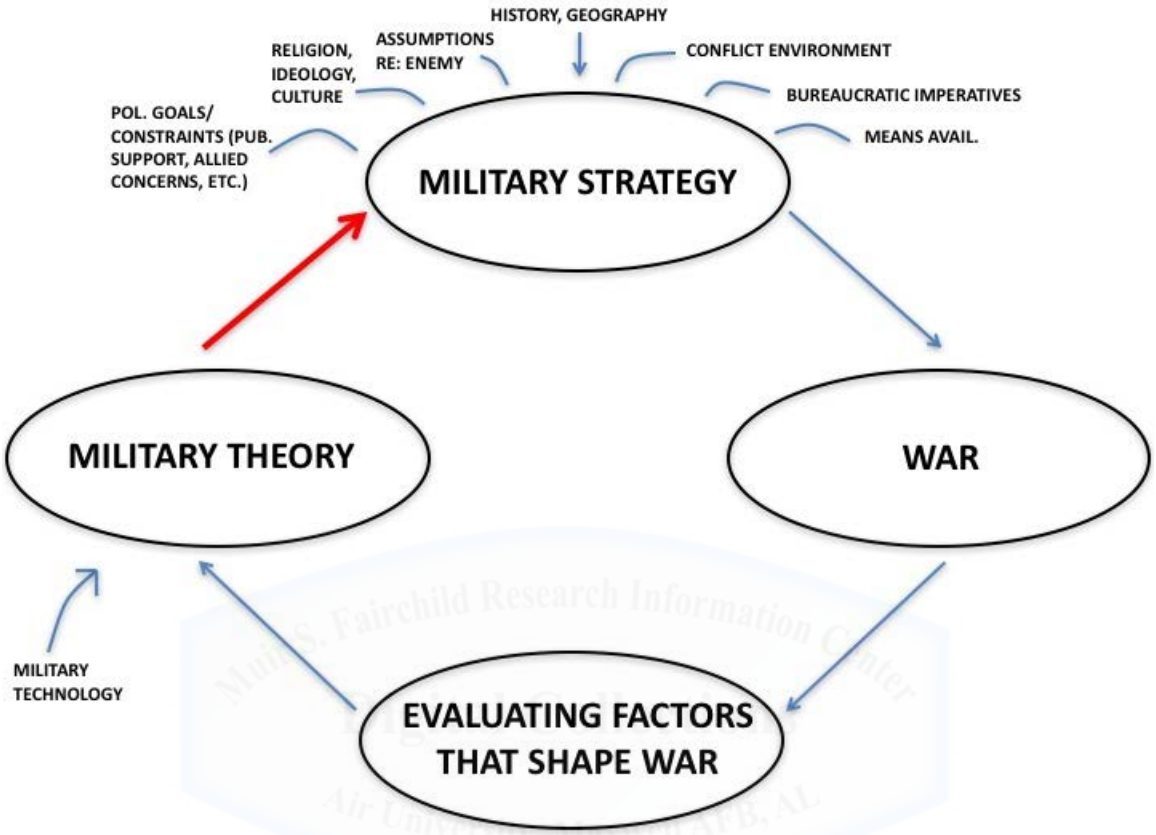


Figure 2: "Designing Strategy: A Cyclical Process" (Source: National War College, 6200 Syllabus, Oct 1, 2014, p. 17).

Starting on the right side, a particular war shapes thinking through evaluation of that conflict. The evaluation then affects military theory through a process of learning based on assumptions regarding the character and nature of war. The character of war consists of who fights, why they do so, and how they do so, both in terms of the magnitude of the resources employed and how they are used. The nature of war consists of the relationship among emotion and the populace; creativity, chance, and the military; and reason and government. Theory is also influenced by new technology like the

airplane and nuclear weapons.[11] Then a new war emerges and strategists draw on a host of factors, including theory, to create strategy for the ensuing conflict.[12] The resultant strategy is taken into the next war and the learning cycle repeats itself.

The focus of this research is on the red arrow in Figure 2, and how it can affect the design of military strategy. To be clear, this work simply analyzes *how* theory shapes strategy, not *how much* it will do so in any one context. The realm of theory is always present, but its peculiar force varies from one context to another. Therefore, theory is merely one critical path for translating ideas into strategy, but it is neither the only path nor the only influence that shapes a strategy. Yet while there are many factors shaping strategy formulation, few are more under the control of the strategist than the theory by which they argue for the selection of ways.

Theory exists in all professions. As such, theory construction is a "meta-discipline" like ethics or systems thinking.[13] One could say theory is so fundamental to a profession that it often defines it. Indeed, good theories are predictions about how reality works in a particular subject.[14] For example, John Dalton's atomic theory built the foundation for nuclear energy and nuclear weapons long before an atom could be observed. Dalton's theory was an excellent approximation about how reality works.

[11] How technology forms is its own subject in social theory and the philosophy of science. Technology is said to have three origins: human agency, social agency, and technological agency. Which force drives the specific technology is also likely to affect the manner that technology shapes theory. For more information see Daniel Boorstin, *The Discoverers* (human agency), Wiebe E. Bijker et. al., *The Social Construction of Technological Systems* (social agency), and Merritt Roe Smith et. al., *Does Technology Drive History* (technological agency).
[12] Gray, *The Strategy Bridge*, 38-41. For another perspective on the mulitple variables that influence strategy design, see Gray's seven contexts of strategy.
[13] The subject of theory is a meta-discipline spanning the professions. The terms in this research are inter-disciplinary, drawn largely from the philosophy of science, sociology, and medicine.
[14] Paul D. Reynolds, *A Primer in Theory Construction*. Indianapolis: Bobbs-Merrill, 1971), 10-11.

Webster's agrees with this basic meaning. "Theory suggests ideas about what is possibly true or real."[15]

In *Theory Construction and Model-Building Skills*, James Jaccard and Jacob Jacoby define theory as "a set of statements about the relationship(s) between two or more concepts or constructs."[16] These sets tell a story about how reality works.[17] Carl Builder describes theory as "a supposition or conjecture about the relationships between things. Theories explain *why*."[18]

If a theory explains a subject like Iran's nuclear program or Chinese cyber threats, it is a *descriptive theory*. If a theory explains how or why something could be done about those issues in the future, it is a *prescriptive theory*.[19] Descriptive theory attempts to describe the present: what *is* actually occurring; how reality works. Prescriptive theory aims at the future and what *could or should* occur; how reality could be leveraged.[20] In

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[15] Merriam Webster Online Dictionary, "theorize", Merriam-webster.com (accessed Nov 21, 2014, 1145).
[16] James Jaccard and Jacob Jacoby, *Theory Construction and Model-Building Skills: A Practical Guide for Social Scientists* (New York: The Guilford Press, 2010), 28.
[17] Paul D. Reynolds, *A Primer in Theory Construction*, 10, 11. Looking closely at theory we may find it in three basic formats:

1. The "set-of-laws" form defines theory as a set of well-supported empirical generalizations, or "laws." Here, theory is thought of as "things we feel very certain about."
2. The "axiomatic" form defines theory as a set of interrelated propositions and definitions derived from axioms (i.e., things we feel certain about).
3. The "causal" form defines theory as a set of descriptions of causal processes. Here, theory "tells us how things work."

Using these three forms, Reynolds defines theory as "abstract statements that are considered part of scientific knowledge in either the set-of-laws, the axiomatic, or the causal process forms" (11).
[18] Carl H. Builder, *The Icarus Syndrome: The Role of Air Power Theory in the Evolution and Fate of the U.S. Air Force* (New Brunswick: Transaction Publishers, 1994), 206. Further elaboration will show the use of "conjecture" in this definition blends the meaning of theory with hypothesis which are not one in the same. The emphasis on "why" is however, at the heart of theory.
[19] M. Neil Browne and Stuart M. Keeley, *Asking the Right Questions: A Guide to Critical Thinking* (Boston: Pearson, 2015), 24-25. The authors explain the descriptive/prescriptive distinction in understanding any issue or conclusion. This parallels what is known as the is/ought or normative/positive distinction in the social sciences. Strategy requires both aspects of thought: understanding how something is currently and how we want it to be.
[20] Peter Godfrey-Smith, *Theory and Reality: An Introduction to the Philosophy of Science* (Chicago: The University of Chicago Press, 2003), 6. See also Jaccard and Jacoby, *Theory Construction and Model-Building Skills*, 15, 16.

strategy, both forms of theory are needed. Description is the basis of diagnosing a strategy situation and the selection of ways is prescriptive about what could be done about it.

Theory should be broken down one more level into "concepts" to make the actual substance of a theory less mystical. These semantic details are only interesting when bearing in mind the potential life and death nature of theory in war. Concepts are the building blocks of theories. Their nature merits some exploration since concepts have such a prominent place in strategy. Jaccard and Jacoby describe how "concepts are the building blocks for all thinking."[21] These authors highlight seven helpful features of concepts.[22]

1. *Concepts are generalized abstractions*. Concepts allow ideas to be generalized and applied to numerous specific cases. The abstract quality of concepts is at once what carries their transfer value from one situation to the next yet allows them to be tailored to each context. Once concepts are set in a strategy they act like a beacon to guide strategy implementation through the diverse situations encountered by the actors involved.
2. *Concepts encompass vast possibilities*. Like paint for the artist or notes for the musician, concepts allow for creative combinations. This feature of concepts enables innovation in strategy—a key avenue for tailoring theory to the novel character of each situation. Sun Tzu captured the vastness of possible strategy combinations in this simple manner. "The musical notes are only five in number but their melodies are so numerous that one cannot hear them all. The primary colors are only five in number but their combinations are so infinite that one cannot visualize them all. The flavors are only five in number but their blends are so various that one cannot taste them all."[23]
3. *Concepts are hypothetical*. The hypothetical nature of concepts cuts like a two-edged sword. On one hand, concepts are necessary for conjecture about what to do. On the other hand, concepts are never the same as reality *per se*; they just intend to represent reality. The more concepts depart from reality, the less reality serves as a partner to success.

[21] Jaccard and Jacoby, *Theory Construction and Model-Building Skills*, 11.
[22] Jaccard and Jacoby, *Theory Construction and Model-Building Skills*, 10-13. The seven aspects of concepts come from Jaccard and Jacoby. The narratives for each aspect have been adapted.
[23] Sun Tzu, *The Art of War* (Oxford: Oxford University Press, 2005), 137 (Chapt 5, sect 8-10).

4. *(Most) concepts are learned*. How reality works is passed along from experience, experiment, exercise and study. Strategists amass as many concepts as possible to combine them in different contexts (see figure X, Chapter 6).
5. *Concepts are socially shared*. For concepts to successfully pass among individuals, there must be a shared background for context. "Consider trying to discuss the motions of balks, punts, and love-15 with someone who does not understand baseball, football or tennis…" Likewise, for a theory of action to succeed across large organizations there must be a shared ability to conceptualize the concepts in a strategy.
6. *Concepts are reality-oriented (or functional)*. The worth of a concept is its tie to the external world. Concepts are functional in that they "work." This aspect of concepts allows theory to be the substance upon which a strategy turns and takes effect.
7. *Concepts are selective constructions*. Matching a strategy to a situation can be conceptualized in countless ways but in the end a partial selection must take place from the sea of possible ideas. Selecting ways amidst the unlimited possibilities of concept-combinations is at the heart of why understanding the theory structure is so critical. The selection of concepts is at once how a strategy can be brilliant (well selected) or disastrous (poorly selected).

Understanding the nature of a concept is important to determining the role that theory plays in providing logic to a strategy. Yet concept-building blocks alone do not explain the meaning of theory. Theory also consists of levels--or a hierarchy--that affect strategy design.

Fortunately, strategy is not the first discipline to discover the existence of levels in theory.

In the philosophy of science, two competing schools of thought debate how theories work: the syntactic and semantic views. Empiricists like David Hume, Rudolf Carnap, Ernest Nagel, and Hans Reichenbach advanced the syntactic view, also called "The Received View." These authors hold that theories can best be understood by their internal and external consistency. Internal consistency indicates how the basic concepts and relationships work within the theory (to include self-evident truths, language of the theory, and matters of convention). External consistency pertains to how the factual

content of the theory relates to the external world since, to an empiricist, the world cannot be understood by pure reason—it can only be known by experience.[24]

On the other hand, the semantic view pinpoints a significant problem inherent in the syntactic view. Nancy Cartwright and others argued that the syntactic view is misleading about how scientific theories really work.[25] These authors argue that the connections between abstract rationales in theory--and the concrete vetting of those rationales--are "complex, non-deductive, and *involve the use of many [other] theories, models and assumptions that are not yet part of the original theory*."[26] Thus, families or levels of theories are essential to understanding the diverse phenomena surrounding any complex subject in question.

The field of medicine provides an example of how the semantic view works by outlining four levels of theory (see table 1). *Metatheory* is theory about theory. *Grand Theory*, also called "macrotheory," are the most complex and broadest in scope. They attempt to explain broad areas within a discipline and may incorporate numerous other theories. *Middle Range Theory* lies between modes and practice theories. Middle range theory encompasses a limited number of concepts and a limited perspective of the real world. *Practice Theories* are also called microtheories, prescriptive theories, or situation-specific theories. Practice theories produce specific logic and directions for applications or practice. Practice theories contain the fewest concepts and refer to

[24] *Encyclopedia of Philosophy*, 2ed, vol 9, "Theories and Theoretical Terms" (Farmington Hills, MI: Thompson Gale, 2006), 412-415.
[25] For an original account of the semantical view see Nancy Cartwright see *How the Laws of Physics Lie* (1983) and *Nature's Capacities and Their Measurements* (1989).
[26] *Encyclopedia of Philosophy*, 416 (emphasis added).

specific, easily defined phenomena. In strategy, this level compares to theories of action.[27]

Table 1: Levels of Theory Comparison with Medicine (Source: Melanie McEwen and Evelyn M. Wills, *Theoretical Basis for Nursing*, 4th ed. (Philadelphia: Wolters Kluwer, 2014), 37, 38).

Theory Level in Medicine	**Level of Abstraction**	**Definition**	**Theory-to-Strategy Comparable**
Metatheory	Most abstract	Theory about theory	Multi-disciplinary theory
Grand theories		Explain broad areas in a discipline	General strategic theory
Middle range theories		A limited but distinct number of concepts that can be operationally defined	Paradigms
Practice theories	Least abstract	Situation-specific theories that produce directions for practice	Theories of action

Thus, Cartwright's approach in the philosophy of science has transfer value to other fields like medicine. This research indicates it is time to transfer her observation to strategy as well.

One Guiding Principle for the Upstream Model

Examining the individual levels of theory will illustrate how each affects the development of strategy. It is instructive to first step back to the work of Carl von Clausewitz to highlight the general importance of theory and the existence of "levels." Clausewitz carved a pathway into the levels of theory by distinguishing between the nature and character of war. He noted that the elements comprising the *character* of war

[27] For an example of how families of theories work in the semantic view see, Melanie McEwen and Evelyn M. Willis, 3ed., *Theoretical Basis for Nursing* (Philadelphia: Wolters Kluwer, 2011), 34-35.

constantly change, while the elements comprising its *nature* will remain constant. Both war's changing and unchanging aspects are always at play, and thus, both will form the basis of applied military theory.

When developing strategy, military and political leaders transfer their enduring beliefs about the nature of war, as well as their thoughts about the unique character of the war at hand. This process of transferring their values from the past and developing their notions about the ever-changing present is at the heart of how theory affects the design of strategy. Dr. Hal Winton at the Air Force School of Advanced Air and Spacepower Studies (SAASS) once stated, "every strategic situation is some mixture of transfer value and change and the strategist must sort the difference."[28] When sorting the difference the strategist can rely on concepts spread across general strategic theory from Thucydides forward. Yet the strategist must also transfer and tailor these concepts to the current situation and add new ideas as reality dictates. This is the principle of "transfer value and change."

Clausewitz implied that theorizing—this tailoring of theory to a specific situation—is fundamental to formulating strategy. He did not expressly link theory-to-strategy in any sort of model because that was not his aim. Rather, Clausewitz taught that "theorizing" should concern every strategist. While his discussion on the role of theorizing is not neatly laid out, a slight reordering of his propositions shows that he prized the role of theory in strategy development.

[28] Dr. Hal Winton, SAASS 600 Lecture (lecture, School of Advanced Air and Space Power Studies, Maxwell Air Force Base, Alabama, 20 August 2010.

Clausewitz observed, "every age had its own kind of war."[29] He famously established how the *nature* of war does not change because his trinity of reason, chance and passion is a constant. The ever-present "fog" (uncertainty in war)[30] and "friction" ("factors that distinguish real war from war on paper")[31] both amplify the trinity's enduring nature and compound the role of chance in war.[32]

These aspects of war's eternal nature actually contribute to its changing *character*. Wars vary in purpose, frequency, intensity, type, scope, length, brutality, morality, domain, geography, complexity and context. Thus, no age should be approached with that same view of character from the last. Clausewitz declared, "The first, the supreme, the most far-reaching act of judgment that the statesman and commander have to make is to establish by that test *the kind* of war on which they are

[29] Carl von Clausewitz, *On War* (Princeton: Princeton University Press, 1976), 593.
[30] Clausewitz defined fog as the unreliability of all information (p 140). War exists is the realm of uncertainty (p 101). About 75% of the factors on which action in war is based are wrapped in a fog of uncertainty (p 101).
[31] Clausewitz, *On War*, 119. He observed that friction has four main sources in war that parallel what he calls the four elements of climate in war (p 104). The first element is *danger* which is illustrated by the famous passage beginning with "let us accompany a novice to the battlefield" (p 113). Second, is the dynamics of *physical effort* which acts like a coefficient of all forces. Based on human will, the exact limit of physical effort cannot be determined (p 115). Third, the difficulty of *accurate recognition* constitutes one of the most serious sources of friction by making things appear entirely different from [expectations] (p 117). This part of friction is related to fog in that most intelligence is false (p 117). The problem of accurate recognition creates one of the great chasms between planning and execution (p 118). Fourth is the concept of cumulative effects. *Difficulties accumulate* in the climate of war and produce a kind of friction that is inconceivable unless one has experienced war (p 119). This is illustrated by a traveler making a simple decision that turns into a cascade of problems from cumulative effects (p 119). Clausewitz further defined friction as "the force that makes the apparently easy so difficult" (p 121). In Clausewitzian parlance, fog and friction are often stated along side of "chance" due to such passages: "This tremendous friction, which cannot, as in mechanics, be reduced to a few points, is everywhere in contact with chance, and brings about effects that cannot be measured, just because they are largely due to chance" (p 120).
[32] For further information on how this impacts broad approaches to strategy, see Thomas Schelling's *The Strategy of Conflict* (Boston: Harvard University Press, 1980). In this work he describes three main games that are played in conflict: games of skill, games of chance, and games of strategy. Games of skill are won when an opponent is simply better, bigger or more skillful than another. Games of chance are won when things go in favor of a player. Games of strategy are won by out-thinking a player, even if that other player is more skillful. In this game theory approach to war, 1/3 of the whole concept is shaped by "chance"—a force to which Clausewitz pays great tribute.

embarking."[33] This changing character of war also affects the theory appropriate to it. The Prussian further observed, "each period therefore would have held to its own theory of war [because] the events of every age must be judged in the light of its own peculiarities."[34]

The differences between the nature of war and its changing character produce differing components of theory derived from each. While Clausewitz did not use these terms, a *general* theory may be derived from the enduring nature of war, while *special* theories (or theories of action) may be tailored to its changing character. Like other enterprises, a *general* theory of war is rooted in the unchanging phenomena of the subject. For Clausewitz, any theory of war addressing its changing character must

Table 2: General and Special Theory Inferred from Clausewitz

Aspect of war	**Theorist activity**	**Type of theory**	**Time Quality**
Nature of war	Transfer value	General theory	Timeless
Character of war	Adaptation, change	Theory of action	Timely

always take into account its constant nature. His prelude to *On War* states if there were no patterns in the nature of war, a general theory of war would not be possible.[35] He concluded, "war, though conditioned by the particular characteristics of states and their armed forces, must contain some more general—indeed, a universal—element with

[33] Clausewitz, *On War*, 100, emphasis added.
[34] Clausewitz, *On War*, 593.
[35] Clausewitz, *On War*, 71. "[War] deals with matters that no permanent law can provide for. One would agree, and abandon the attempt, were it not for the obvious fact that a whole range of propositions can be demonstrated without difficulty." He follows with examples of timeless propositions and his (unfinished) plans for the book.

which every theorist ought above all to be concerned."[36] Thus, from general theory stems the value of tried and true historical concepts. These universal elements serve as an anchor of any special theory of war since they—like his trinity—do not change over time, much like the fundamental concept of gravity in physics.

Theories of action are special theories tailored to war's varying character. As mentioned, the character of war comprises elements of war that change from one conflict to the next. Those variables include *who* fights (on all sides), *why* they fight (motivations and ends), and *how* they conduct warfare to achieve their desired ends (means and approaches).[37] The character of war generates theories of action to match changing realities like ends and means, which are revealed by who is fighting, why they are fighting and critically, how they are fighting. For example, there are four theories of action in this study: two from World War II (Industrial Web Theory and Morale Effect Theory) and two from the post-Cold War era (Enemy as a System and Crony Attack). In chapter 5, I will further draw upon two other theories of action from the 9/11 era: the "Afghan Model" and F3EAD Model (Find-Fix-Finish-Exploit-Analyze-Disseminate).

As with these examples, Clausewitz instructed that a strategist should adapt new theory to contemporary reality using both new principles *and* the universal element with "which every theorist ought to be concerned." For, "while there may be no system, and no mechanical way of recognizing the truth, truth does exist."[38] Thus, principles should be a part, but not the whole, of any adaptive theory of war.[39]

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[36] Clausewitz, *On War*, 593.
[37] National War College Syllabus, "War, Statecraft, and the Military Instrument of Power," 1 Oct 2014.
[38] Clausewitz, *On War*, 517.
[39] Over 100 years later, Sir Basil Liddell Hart wrote something similar. Meditation on the principles informs new "ways" for each circumstance. He wrote, "'Is there a practical way of combining progress towards the attainment of truth with progress towards its acceptance? A possible solution of the problem is suggested by *reflection on strategic principles*—which point to the importance of maintaining an object

This view of general theory and theories of action combines the timeless and timely in strategy (see table 2). Timeless theory stems from general theory. Timely theory is tailored to the unique character of war in the form of theories of action. Blending timeless and timely theory for war is also internally consistent with Clausewitz' overall definition of strategic theory. He observed, "strategic theory… attempts to shed light on the components of war and their interrelationships (i.e. character) stressing those few principles or rules that can be demonstrated" (i.e. nature).[40] Yet, when theories of action are properly tailored to an era it will "emphasize the essential and general; leave scope for the individual and accidental; but remove everything arbitrary, unsubstantiated, trivial, far-fetched, or super-subtle. If we have accomplished that we regard our task as fulfilled."[41] While *On War* was an unfinished work, Clausewitz consistently thought along these lines: a comprehensive theory of war that combined general and specific theory emanating from its nature and character respectively. His implied view on the need for both general theory and theories of action also appears in other sources.

When Clausewitz joined Russia to fight Napoleon he was faithful to leave behind a manual for Frederick William III after Frederick signed a treaty with France. The title was *The Most Important Principles for the Conduct of War to Complete My Course of Instruction Of His Royal Highness The Crown Prince*. In the last line of this work, Clausewitz emphasized how established theory should marry with contemporary reflection. "These principles (i.e. from the nature of war), therefore, will not so much give complete instruction to Your Royal Highness, as they will stimulate and serve as a

consistently and, also, of pursuing it in *a way adapted to circumstances*" (*Strategy*, xxi, italics added).
[40] Clausewitz, *On War*, 177.
[41] Clausewitz, *On War*, 633.

guide for your own reflection" (i.e. to apply to the character of war).[42] Like similar statements from *On War*, this advice to Frederick William III is consistent with how an individual's view of theory contributes to the design of strategy.

Clausewitz mixture of timeless and timely has interesting parallels in the works of Thomas Kuhn, J.C Wylie and Donald Schön. In the philosophy of science, Kuhn names "the essential tension" as science between convergent thinking (i.e. traditional science) and divergent thinking (i.e. revolutionary science).[43] In a classic of strategy, J.C. Wylie writes,

> … theory serves a useful purpose to the extent that it can collect and organize the experiences and ideas of other men, sort out which of them may have a valid transfer value to a new and different situation, and help the practitioner to enlarge his vision in an orderly, manageable and useful fashion—and then apply it to the reality with which he is faced.[44]

Finally, in educational psychology Donald Schön described this tension between old and new as between what is familiar and what is not. He wrote how learning is "to see the unfamiliar situation as both similar to and different from the familiar one, without at first being able to say 'similar' or 'different' with respect to what."[45] In all cases examined in this study, what is similar provides the transfer value while what is unique provides the need for conceptual change.

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[42] Carl von Clausewitz, *Principles of War*, ed. Hans Gratzke, trans. Hans Gratzke (Milton Keynes UK: Lightening Source UK Ltd, 2010), 11.
[43] Thomas S. Kuhn, *The Essential Tension: Selected Studies in Scientific Tradition and Change* (Chicago: University of Chicago Press, 1977), 226,27.
[44] J.C. Wylie, *Military Strategy: A General Theory of Power Control* (Annapolis: Naval Institute Press, 1989), 31. This observation is echoed by Colin Gray in *Modern Strategy*, 127. He wrote, "every war is both unique yet also similar to other wars."
[45] Schön, *Educating the Reflective Practitioner: Toward a New Design for Teaching and Learning in the Professions*, 67.

II. Defining the Levels of Theory and Ways

Multi-Disciplinary Theory

Strategists draw upon four distinct levels of theory to select ways for strategy and integrate war's changing and unchanging nature with the relevant phenomena surrounding war itself. Those levels are: multi-disciplinary theory, general strategic theory, paradigms, and theories of action. Multi-Disciplinary Theory represents explanations about various phenomena or relationships beyond war itself. Using multiple disciplines broadens the amount of reality a strategist can approximate. International relations, political science, economics, classical social theory, hard sciences, psychology, ethics, communications and law are just a few of the fields that expand the strategist's horizons to leverage subjects that exist independent of war.

Examples of this level are manifold. Industrial Web theorists in World War II drew upon macroeconomics to determine what components of industry represented bottleneck targets in the German war machine. Morale-Effects theorists in the same war drew upon human philosophy and psychology to justify bombing civilian populations to break German will. In Operation Desert Storm, Air Force Colonel John Warden applied systems engineering to form a new paradigm that yielded solid results.[46] Strategists operating at the national level routinely rely on concepts of international relations such as appeasement, the "security dilemma", realism, idealism, and just war theory. The business world has begun to teach the importance of applying concepts from all disciplines in a new international certification for Innovation Management.[47] When

[46] Chapter 3 will elaborate on the meaning of systems engineering and the transfer value it provided to strategy in the Gulf War.
[47] Innovation Associate Workshop: GIM Institute Level 1 Certification (Boston: IXL Center Inc, 2014).

NASA tried to figure out how to fold a massive solar cell for deployment into space, its scientists turned to lessons from origami to fold and pack the cell.[48] These are a few examples for the utility of a multidisciplinary approach. The value of this approach helps explain why strategy schools like the US National War College and the School of Advanced Air and Space Power Studies (SAASS) both teach foundational courses that promote multi-disciplinary understanding.

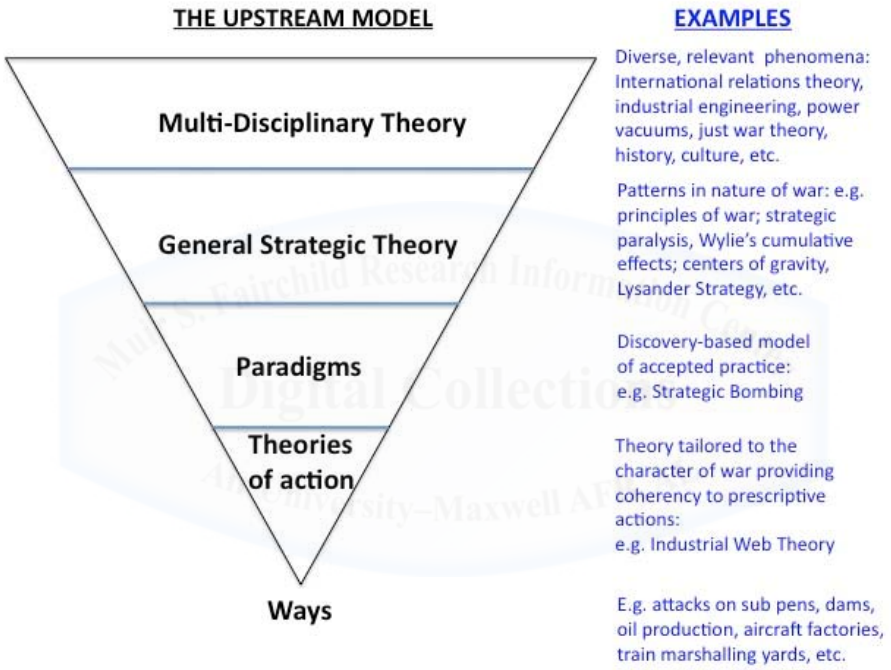

Figure 3: The Upstream Model (example from World War II).

General Strategic Theory

General strategic theory originates from the timeless works of strategy. General theory includes unchanging law-like first principles associated with phenomena inherent

[48] Liz Stinson, "NASA Invents a Folding Solar Panel Inspired by Origami," *Wired*, Sep 22, 2014, accessed May 27, 2015, http://www.wired.com/2014/09/nasa-invents-folding-solar-panel-inspired-origami/.

to competition and winning war. As such, general strategic theory is like the "pattern language" for competition itself and the profession or arms.[49]

Gray bounded general strategic theory in his book, *The Strategy Bridge*. He argued that general strategic theory is the set of concepts found in the work of 10 theorists (see table 3). Of this list Gray wrote, "The general theory of strategy has universal and eternal validity and arguably is located, to date, in the works of no more than ten authors who have written over the course of 2,500 years."[50] The works on his list represent lasting and powerful contributions to the repeating phenomena in the nature of war.

Gray's general strategy list should remain open "as a living field".[51] While it is difficult to improve upon these works, there are important repeating phenomena in the nature of war that are found outside these 10 authors. Consider the literature associated with "Long Term Competitive Strategy" (LTCS)[52] and the practice of operational net assessment. One could argue that LTCS could be found back to Themistocles efforts to radically shift Athenian defense policy by taking a long-view of the conflict with Persia.[53]

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[49] Christopher Alexander, Sara Ishikawa, and Murray Silverstein, *A Pattern Language: Towns, Buildings, Construction* (New York: Oxford University Press, 1977), x. In this fascinating work, the phrase "pattern language" captures timeless fundamentals for making towns and buildings. The fundamentals are patterns that describe, "a problem which occurs over and over again in our environment, and then describes the core of the solution to that problem, in such a way that you can use this solution a million times over, without ever doing it the same way twice." These problem patterns and core solutions are like classic strategic concepts that Colin Gray calls skeleton keys of strategy: Thucydides' fear, honor, and interest motives of war; Clausewitz's forces of reason, chance and passion; strategic, operational and tactical levels of war; ends, ways, and means; etc.

[50] Gray, *The Strategy Bridge*, 264.

[51] Gray, *The Strategy Bridge*, 3. Gray's aspiration in this work is to make an original contribution to general strategy theory. As such, by compiling the 10 classic authors of strategy he did not intend to say "nothing else counts" for the author himself was trying to make a lasting contribution to the same.

[52] For an example of this literature see Thomas Mahnken, ed. *Competitive strategies for the 21st century: theory, history, and practice* (Standford, Stanford University Press, 2012).

[53] Murray, Williamson, and Richard Hart Sinnreich, eds. *Successful Strategies: Triumphing in War and Peace from Antiquity to the Present* (Cambridge: Cambridge University Press, 2014), 19-21.

Yet neither the case of Themistocles nor the comprehensive LTCS literature articulated after the Cold War can be found concisely in Gray's list of 10 authors. So it does not follow that important general strategic theory ends with the books in Table 3.

Table 3: Colin Gray's List of Classics that Comprise General Strategic Theory (Source: *The Strategy Bridge*, Colin Gray).

Merit Category	**Author**	**Books**
First Division	Carl von Clausewitz	*On War* (1832-4)
	Sun-Tzu	*The Art of War* (ca. 490 BC)
	Thucydides	*The Peloponnesian War* (ca. 400 BC)
Second Division	Machiavelli	*The Art of War* (1521)
		The Prince (1522)
		Discourses on Livy (1531)
	Jomini	*The Art of War* (1838)
	Liddell Hart	*Strategy: The Indirect Approach* (1941)
	Wylie	*Strategy: A General Theory of Power Control* (1967)
	Luttwak	*The Logic of War and Peace* (2001)
Third Division	Brodie, (ed.)	*The Absolute Weapon: Atomic Power and World Order* (1946)
		Strategy in the Missile Age (1959)
		War and Politics (1973)
Fourth Division	Schelling	*The Strategy of Conflict* (1960)
		Arms and Influence (1966)
Other Contenders	Caesar	*Commentaries* (d. 44 BC)
	Mahan	*The Influence of Sea Power Upon History* (1890)
	Corbett	*England in the Seven Years' War* (1907)
		Some Principles of Maritime Strategy (1911)
	Fuller	*Armament and History* (1946)
	Boyd	*A Discourse on Winning and Losing* (1987)
	van Creveld	*The Transformation of War* (1991)
		The Culture of War (2008)

For another example, Richard Rumelt's recent work "Good Strategy, Bad Strategy" adds foundational insight into strategy methods by suggesting a three-part-theory structure at the heart of every good strategy ("the kernel").[54] General strategic theory like Rumelt's does grow and advance, albeit more slowly than other levels of theory like paradigms and theories of action.

Second, Gray's list is not really global and may therefore miss lesser-known works that have equal merit for inclusion into general strategic theory. In India, strategists are just becoming familiar with the work of Kautilya.[55] From Russia, Mikhial Tuchachevski's works were not translated into English until 1987.[56] And while Gray includes Romans like Caesar, his concise bounding of general theory excludes the concepts of lesser-known Romans like Frontinus embedded in the book, *Strategems*.[57] Gray also omits modern theorists of insurgency like Mao Zedong.

Finally, strategy as a field of study has evolved into a meta-discipline like ethics and systems thinking. Strategy is no longer confined to the profession of arms exclusively. Thus, to create Wylie's "widest possible field for [our] intellect to operate in,"[58] general strategic theory should be open to classics of strategic theory from other disciplines. For example, Henry Mintzberg's five categories of strategy (see Figure 15)

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[54] Richard Rumelt, *Good Strategy Bad Strategy* (New York: Crown Business, 2010), 7. The guiding policy specifies the approach to dealing with the obstacles called out in the diagnosis. It is like a signpost, marking the direction forward but not defining the details of the trip. Coherent actions are feasible coordinated policies, resource commitments, and actions designed to carry out the guiding policy. As simple as this construct may sound, it is not hard to find strategies that are lacking one or all of these elements.

[55] Vinay Vittal, "Kautilya's Arthashastra: A Timeless Grand Strategy" (master's thesis, School of Advanced Air and Spacepower Studies, 2011).

[56] Richard Simpkin, *Deep Battle: The Brainchild of Marshal Tukhachevskii*, trans. Richard Simpkin and John Erickson (London: Brassey's Defense Publishers, 1987).

[57] Sextus Iulius Frontinus, *Strategems: Aquaducts of Rome* (Cambridge: Harvard University Press, 1925).

[58] J.C. Wylie, *Military Strategy: A General Theory of Power Control* (Annapolis: Naval Institute Press, 1989, 30.

has transfer value to understanding military cases like the 2003 Iraq War. Any attempt to limit general strategic theory to the works of the military profession also reduces the intellectual capital from which to draw for tailoring theories of action.

Paradigms

Paradigms are models of accepted or emerging practice. Thomas Khun made the term paradigm famous in the philosophy of science. In the military, the term "doctrine" comes closest to the concept of "paradigm." To Kuhn, a paradigm is a tradition of discovery-based rules and assumptions.[59] The tradition stems from achievements that, for a time, provide model solutions for a community of practitioners facing common problems.[60] The paradigm directs the research methodology including what questions to ask and how to interpret results for a certain type of problem. A paradigm may have different schools of thought[61] that behave like theories of action. For example, in World War II the "Industrial Web Theory" and "Morale Effects Theory" were different schools of thought within the common paradigm of strategic bombing. Both schools of thought shared assumptions common to the overall paradigm.

Paradigms often take the form of doctrine in the military. Doctrine is officially sanctioned practice based on study and experience. However, the paradigm level of theory is *by no means* limited to doctrine. When theory changes at the paradigm level it will not immediately appear in the form of doctrine even though the change may indeed shape strategy. Therefore, doctrine alone often fails to determine how theory relates to

[59] Thomas Kuhn, *The Structure of Scientific Revolutions* (Chicago: University of Chicago, 1970), 44.
[60] Kuhn, *The Structure*, 10.
[61] Kuhn, *The Structure*, 44.

strategy especially when trying to understand special theories of action underneath existing paradigms that grapple with the changing character of war. Yet, theory can shape strategy through doctrine, especially through the pre-existing traditions or patterns of thoughts among different services. A marine, soldier, airman, sailor, diplomat, etc. may design very different strategies from one another based on their stated or tacit service paradigms. Thus, paradigms cut both ways—both shaping the selection of ways from a well-thought-out school of thought, to blinding one from seeing other options. The paradigm examples in this study include Strategic Bombing, and the shift to Strategic Attack. The Irregular Warfare paradigm in the 9/11 era is also explored in chapter 5.

Special Theories of Action

Special theories of action are notions about strategy tailored to the changing character of war. Theories of action are prescriptive. They provide a direct link to selecting courses of action. Theories of action are tailored to a particular situation, and should provide coherence to the action taken. On occasion, these theories can be referenced by name. In Operation DESERT STORM, the special theory of action was John Warden's "Enemy as a System." In Operation ALLIED FORCE, "crony targeting" became a theory of action (both discussed in chapter 3). In the initial response to 9/11, the US relied on the "Afghan Model" during the first phase of Operation ENDURING FREEDOM before the U.S. elected nation-wide conflict with the Taliban under the theory of Bush Doctrine.[62] In Operation IRAQI FREEDOM, General Tommy Franks'

[62] See Richard Andres, Craig Wills, and Thomas Griffith Jr., "Winning With Allies: The Strategic Value of the Afghan Model," *International Security*, vol. 30, no. 3 (Winter 2005), 1-49; and Richard Andres, "The Afghan Model in Northern Iraq," *The Journal of Strategic Studies*, vol 29, no. 3 (June 2006), 395-422.

theory of action was in part a model that he called, "Lines and Slices."[63] In that same war, General McChrystal and his men in Joint Special Operations Command (JSOC) created the "F3EAD" model to address terrorists at a network level. See table 3 for the theories of action utilized in the case studies.

Table 4: Theories of Action in the Case Study Framework (case 3 from the 911 Era is in development for a later date)

Case Study	**Paradigm**	**Theory of Action**	**Ways**
WWII	Strategic bombing	Morale Effect Theory	Hamburg, Japan Firebombing, Atomic warfare
WWII	Strategic bombing	Industrial Web Theory	War on the sub pens, Dambuster raid, the oil plan
Post Cold War	Strategic attack	Enemy as a System	Warden's rings targeting
Post Cold War	Strategic attack	Crony Targeting	Serbian oligarchy targeting

The term "theory of action" has gained some currency across professions. The works of Peter Drucker, Bernard Brodie, Colin Gray, Everett Dolman, Donald Schön, Peter Checkland and Edward Hayward have all explored meanings for a "theory of action." Peter Drucker referenced a "theory of the business" by which he meant the core ways and ethos of a certain business. He also suggested business strategy was "a firm's *theory* about *how* to gain competitive advantages" over its competition. [64]

Bernard Brodie employed the term in his 1973 assessment of "strategic thinking." He wrote, "Strategic thinking, or 'theory' if one prefers, is nothing if not pragmatic.

[63] Tommy Franks, *American Soldier*, 1st ed. (New York: Regan Books, 2004), 341.
[64] Quoted in Duncan Angwin et. al., *The Strategy Pathfinder*, (John Wiley and Sons Ltd, United Kingdom, 2011), xv (emphasis added).

Strategy is a 'how to do it' … a guide to accomplishing something and doing it efficiently… Above all, strategic theory is a theory for action."[65] Colin Gray has written about the need for a strategy to contain a "theory of victory." He stated, "To plan is to theorize… the practicable looking military solution to a pressing real-world problem is, in a vital sense, a theory." The act of formulating a theory for the necessary action is the heart of what he calls, "creative theorizing."[66] When strategy gets creative, it should have a theoretical component.

Everett Dolman, in his work *Pure Strategy*, did not use the phrase "theory of action" but nearly defined it. He wrote strategists must understand "how the *parameters of action* determine the means and ends chosen in conflict, and to *manipulate the processes that transform* them."[67] Meanwhile, Donald Schön wrote about how to educate professionals. In *Educating the Reflective Practitioner,* Schön used Chris Argyris' "theory in action" and "theories of action." He chose those terms to explain the express and tacit theories behind every designing behavior.[68] For Schön, all actions are theory laden. As such, an individual selects from an array of vast theoretical options to justify an action model.[69] In Peter Checkland's Soft System Methodology (SSM), the process of "building conceptual models" mirrors the building of a theory of action. Checkland's version of a conceptual model tends to focus more on *where* to act rather than on *what* actions to take.[70]

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[65] Bernard Brodie, *War and Politics* (New York,: Macmillan, 1973), 452f.
[66] Colin Gray, *The Strategy Bridge: Theory for Practice*, 241, 42.
[67] Dolman, *Pure Strategy: Power and Principle in the Space and Information Age*, 11 (emphasis added).
[68] Donald A. Schön, *Educating the Reflective Practitioner: Toward a New Design for Teaching and Learning in the Professions*, 1st ed., The Jossey-Bass Higher Education Series (San Francisco: Jossey-Bass, 1987), 255.
[69] Schön, *Educating the Reflective Practitioner*, 324.
[70] What actions to take materialize by his stage #7.

In a monograph, US Army Major Edward P. W. Hayward captured the essence of a theory of action.[71] He noted that a theory of action "involves considering the propensity of the system, as well as the potentials and tensions within it, and determining the areas in which action can achieve a 'change to the environment.'" This work also develops the idea of "meta-questioning" to help arrive at a theory of action by questioning the fundamental theories and assumptions behind the original designs; that includes the three levels of theory in the theory-to-strategy model. Hayward then portrays "elements" or "assemblages" flowing from a theory of action that resemble several terms used to convey "ways" in strategy.[72]

While other examples exist, this sample of sources traces how "theory of action" has become a useful term to describe a level of theory.[73] Taken collectively, the authors suggest that a theory of action precedes the development of a strategy by fusing—and tailoring—the concepts essential to its design. This process of blending theoretical notions and tailoring them to a specific situation is a dynamic one, occurring throughout the three levels of theory, but most rigorously during the final step of a special theory of

[71] Another good definition appeared in draft doctrine. US Army TRADOC, "Design Field Manual (Interim) Fmi 5-2 Version 7.0," (Ft. Levenworth: US Army TRADOC, 2009), 33. "The theory of action is a single logic that binds together the pattern of [strategic] interventions into a coherent whole. The theory of action is not strictly part of the problem frame, but it usually emerges during problem framing as the design team realizes the nature of the intervention. The theory of action should be a simple and suggestive insight about how the interventions will be orchestrated to move towards the desired system."

[72] Edward P. W. Hayward, "Planning Beyond Tactics: Towards a Military Application of the Philosophy of Design in the Formulation of Strategy" (United States Army Command and General Staff College, 2008), 39-41.

[73] See also Vijay Govindarajan and Christ Trimble, "Strategic Innovation and the Science of Learning," *MIT Solan Management Review*, no. Winter 2004 (2004): 75, e7. "Discovery-Driven Planning" (1995) and "Theory-Focused Planning" (2004) both attempted to move normal planning more toward strategy with a 'theory' and 'discovery' focus. The emphasis on 'discovery' and 'theory focus' are reminiscent of theorizing for theories of action. One difference between these models and a theory of action is the logic of their origins. Both discovery-driven and theory-driven models engendered for situations that pose more unknowns than knowns. Tamara Sniad Claudia Weisburd, "Theory of Action in Practice," *The Evalutation Exchange* XI, Number 4, no. Winter 2005/2006 (2005), provides an example from the field of education.

action, when the specifics of a particular problem come most clearly into view. That final level of theory lends directly to a strategy—the courses of action that will help achieve the desired political goal.

Overall, these four levels of theory—multidisciplinary, general, paradigms and special theories of action—may appear to be sufficient to capture the anatomy of theory used in strategy. Yet, the theory-to-strategy process culminates in the selection of ways for a strategy. The theory combines with possible courses of action that yield distinct "ways" in the ends-ways-means strategy framework.

Ways

The meaning of ways is strangely ambiguous in the strategy discourse. In the ends-ways-means framework, ends represent political objectives, while means are what is needed (e.g. capabilities and resources) to achieve the desired ends.[74] For a working definition in this study, "ways" are *the blend of concept and action directing how means are used to achieve ends.* This hybrid nature of strategic ways—the blend of concept and action—is derived from two key sources. In the literature, modern definitions of "ways" show a sliding scale of meanings from "concepts" to "courses of action" (COAs). In practice, many strategy development methods use a range of terms that—when studied together—point to this blend of concept and action as the meaning of "ways."

The word "ways" begins to appear prominently around 1979 in American strategic literature. Until then, definitions of strategy typically referenced the words "ends" and "means." Yet the *identification* of "ways" is ancient. Sun Tzu's *Art of War*,

[74] National War College Syllabus, Course 6200, "6200 Terms," 1 Oct 2014, 175-177.

for example, offers many examples of ways to achieve a war aim.[75] Clausewitz also referenced the concept as he cataloged the different ways that tribes and city-states chose to wage war.[76] He wrote, "The semibarbarous Tartars, the republics of antiquity, the feudal lords and trading cities of the Middle Ages, eighteenth-century kings and the rules and peoples of the nineteenth century—all conducted war in their own particular way…"[77] Such references in the classics of general strategic theory illustrate how the meaning of this important word had lost its vitality in the American lexicon and perhaps elsewhere.

The frequent use of the "ends-ways-means" framework obscures how relatively new the usage of "ways" is in the modern lexicon. This novelty appears in both business and military strategy. In 1962, Alfred Chandler's classic business definition of strategy does not use "ways" but rather, "courses of action" which omits the "theory" component of that term.[78] Michael Porter's 1980 classic, *Competitive Strategy*, does not use the word "ways" in his core definition of strategy. He wrote, "The essential notion of strategy is captured in the distinction between ends and means."[79] Nor did Barry Posen include "ways" in his 1984 definition when he wrote, "a grand strategy is a chain of political and military ends and means."[80]

In defining military strategy, Sir Basil Liddell-Hart hinted at ways but he did not

[75] Sun Tzu, *The Art of War*, 137 (Chapt 5, sect 8-10).
[76] Clausewitz, *On War*, 586-594.
[77] Clausewitz, *On War*, 586.
[78] Quoted in Angwin, *The Strategy Pathfinder*, xiv. In Chandler's definition, "the determination of the long-run goals and objectives of an enterprise, and the adoption of courses of action and the allocation of resources necessary for carrying out these goals," goals and objectives are ends, while courses of action are a form of ways. Resources are means.
[79] Porter, *Competitive Strategy: Techniques for Analyzing Industries and Competitors*, xxiv.
[80] Barry Posen, *The Sources of Military Doctrine: France, Britain, and Germany between the World Wars*, Cornell Studies in Security Affairs (Ithaca: Cornell University Press, 1984) 33.

define the word per se. He wrote that strategy was, "the art of distributing and applying military means to fulfill the ends of policy."[81] He further characterized strategy as a "reflection on strategic principles—which point to the importance of maintaining an [end] consistently and, also, of pursuing it in *a way adapted to circumstances*."[82] Nevertheless, Liddell Hart still used the "ends-means" model.[83]

In 1979 Harry Eccles expressly joined the word "ways" with "ends" and "means." He also defined ways as concepts instead of pure courses of action.[84] In 1986 Arthur Lykke Jr. also referred to ways as concepts.[85] These definitions marked a quiet return to what Sun Tzu had always known. Strategy is the *ways* that means are used to achieve desired ends.[86] But *why* the ways are selected for a particular situation harkens to the theory that justifies those choices. Thus, any definition of ways should capture its hybrid nature of theory and action.

In 1988 Arthur Lykke amplified this description as follows: "[Military] *ways* are concerned with the various methods of applying military force. In essence, this becomes an examination of courses of action designed to achieve the military objective. These courses of action are termed 'military strategic concepts'"[87] This blending of "concept" and "course of action" (COA) was essential to a sound explanation of "ways" in the

[81] Liddell Hart, *Strategy: The Indirect Approach*, 321.
[82] Liddell Hart, *Strategy: The Indirect Approach*, xxi. Italics added.
[83] Ibid., c.f. 321-22.
[84] Henry E. Eccles, "Strategy--the Theory and Application," *Naval War College Review* 32, no. May-June (1979), 13. Eccles definition of a strategic concept was anchored to his definition of strategy. "Strategy is the comprehensive direction of power to control situations and areas to attain broad objectives" (p. 12). Eccles defined strategic concept as "a verbal statement of 1) what to control, 2) for what purpose, 3) to what degree, 4) when to initiatie control, 5) how long to control, and 6) in general, how to control" (p. 13). The strategic concept ultimately takes the form of a tactical operation and the supporting logistics.
[85] Arthur F. Lykke, "Toward an Understanding of Military Strategy," *Military Strategy: Theory and Application* (1986): 3-7.
[86] Mark Clodfelter, personal conversation, August 2014.
[87] Arthur F. Lykke, "Defining Military Strategy," *Miltary Review* 69, no. No. 5 (1989): 10.

strategy design process.

In 1987 David Jablonski, editor of the *Roots of Strategy* series, supported the growing concept of "ways" in a key *Parameters* essay.[88] Then in 1995 one of his students, Major General Richard Chilcoat, published a comprehensive paper on the relationship among ends, ways and means.[89] General Chilcoat's analysis could be considered the first foundational explanation of the ends-ways-means method used so commonly today in national security discourse. In the 2006 version of Joint Publication 5-0, "Joint Operations Planning," the definition of ways centers on "methods" at a higher level and "sequences of action" at lower levels.[90] Jack Kem's work on campaign planning also uses "methods" to explain the meaning of ways.[91] Finally in 2008, Harry Yarger expressly defines ways as strategic concepts that "explain 'how' the objectives are to be accomplished by the employment of the instruments of power."[92] In this short usage history, "ways" and how we form them have been neglected for too long even though this broad subject is central to how means are used to achieve ends in strategy.

Combining the various definitions produces a spectrum of meanings that range from actions to concepts. On the left end are definitions that convey the

[88] David Jablonski, "Strategy and the Operational Level of War," *Parameters* XVII, no. Spring (1987).
[89] Richard A. Chilcoat, "Strategic Art: The New Discipline for 21st Century Leaders," *U.S Army War College Paper* (1995).
[90] JP 5-0. Joint Operation Planning, 26 December 2006, III-5, IV-1. "Methods" is on page III-5 and "sequences of action" are on page IV-1.
[91] Jack D. Kem, *Campaign Planning: Tools of the Trade*, ed. U.S. Army Command and General Staff College, 3rd ed. (Fort Leavenworth, Kansas: U.S. Army Command and General Staff College, 2009), 23.
[92] Harry R. Yarger, *Strategy and the National Security Professional: Strategic Thinking and Strategy Formulation in the 21st Century* (Westport, CT: Praeger Security International, 2008), 140-144. Yarger also notes that crafting ways "provides the opportunity for creative strategic thinking [as] perhaps, the highest form of strategic art" (p. 141).

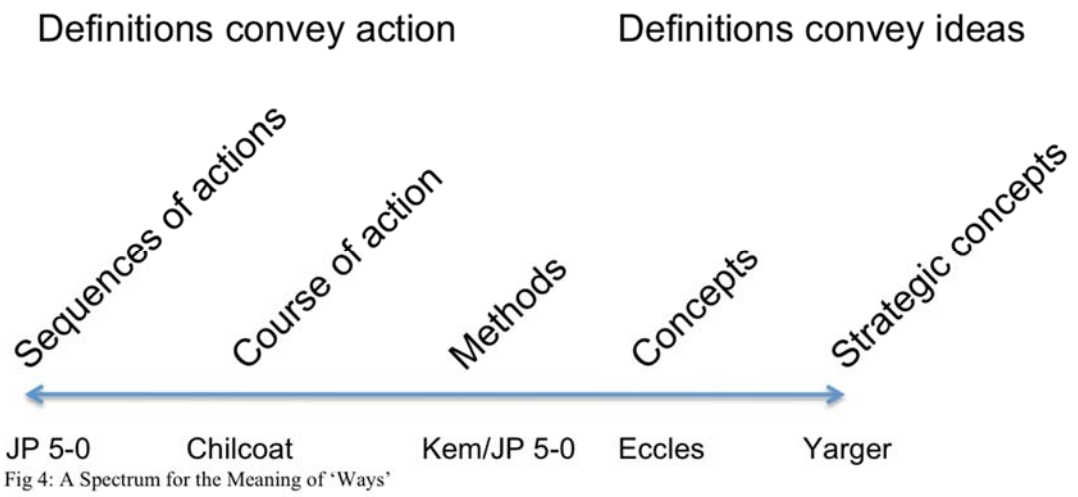

Fig 4: A Spectrum for the Meaning of 'Ways'

Figure 4: A Spectrum for the Meaning of "Ways"

action dimension of ways. On the right end, definitions emphasize the theory-laden nature of ways. The spectrum captures the primacy of COAs without separating them from their logic found in concepts. Defining "ways" as a blend of concept and action that guides how to use means emphasizes how the levels of theory are foundational to strategy development. The theory tailored to the situation determines the ways that political and military leaders will use the means to obtain desired political ends.

Another perspective on the hybrid nature of "ways" comes from the range of terms used in designing strategy. At first glance the following terms could be synonymous with COAs. But upon further review, a common aspect of the terms is the confusion over the hybrid nature of ways—some part theory, some part action.

To capture the hybrid nature of ways, Richard Rumelt uses the term "coherent action."[93] The coherent part comes from (ideally sound) theory and the resulting COAs are the "action" part. To him, strategy is an effective mixture of argument and action

[93] Richard P. Rumelt, *Good Strategy, Bad Strategy* (New York: Crown Business, 2010), 77, 87-94.

which supports the hybrid view of ways.[94] In his strategy development method called "Prometheus," Air Force Colonel (ret) John Warden terms ways the *key descriptors of system change* that lead to the "future picture" (i.e. the ends).[95] Harry Yarger calls these same elements *key strategic factors*. These are "factors the strategist determines are at the crux of interaction within the environment that can or must be used, influenced, or countered to advance or protect the specified interests."[96] This definition is reminiscent of Kenichi Ohame's *key factors of success* which are, "operating areas that are decisive for the success of your particular business."[97]

Another term for ways comes from an Army Central Command (ARCENT) study on "design" methodology. The author, Major Trent Mills, explains that a theory of action flows into a *stratagem*, which can mean "a military maneuver designed to deceive or surprise an enemy."[98] The ARCENT paper leans on the secondary meaning of stratagem:

[94] Richard Rumelt, *Good Strategy, Bad Strategy*, 77.
[95] John A. Warden and Leland Russell, *Winning in Fasttime: Harness the Competitive Advantage of Prometheus in Business and Life* (Montgomery, AL.: Venturist Publishing, 2002), 66-68.
[96] Yarger, *Strategy and the National Security Professional,* 124 (emphasis added).
[97] Ken ichi Ohmae, *The Mind of the Strategist* (New York, NY: Penguin Books, 1983), 42.
[98] The Free Dictionary Online, "stratagem." http://www.thefreedictionary.com/ (accessed 10 April 2011).

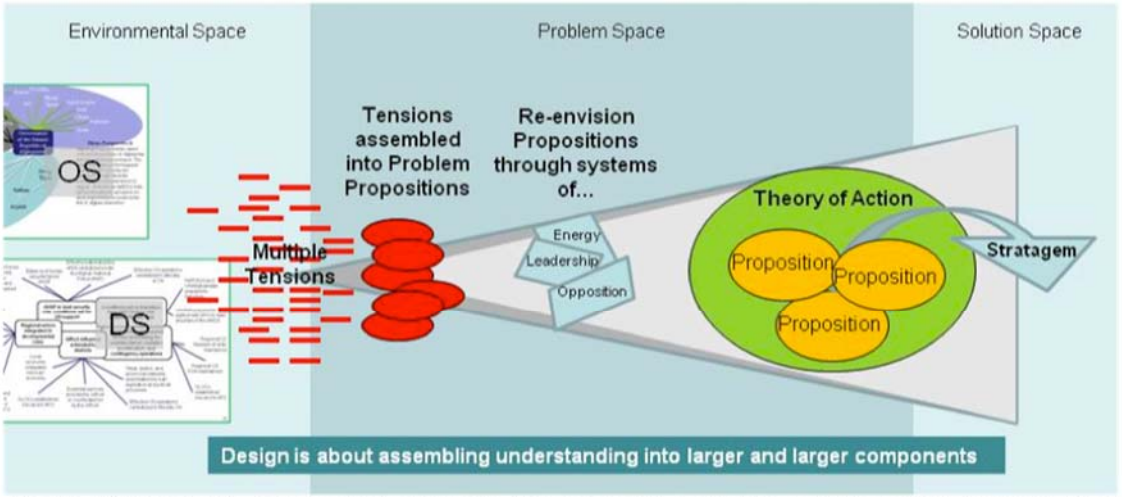

Fig 5*:* "General path to through the Problem Space through inductive steps to create larger and larger pieces of the puzzle." Reprinted with permission courtesy of Trent Mills. Source: Mills, Trent. "Applying Design at Us Army Central/Third Army: What Theory Recommends and What Reality Demands." In *Unpublished white paper*, 2011.

a clever idea or scheme. For Mills, a theory of action consists of propositions, and these propositions ideally lead to "stratagems" which appear to be synonymous with ways (see figure 4). He highlights both the theoretical and action-oriented components of ways by stating, "the stratagem is the central and unique theory that best represents the path to transformation."[99]

The 2010 primer on the design methodology from the Joint Warfighting Center implies that strategists must tailor ways to the situation encountered and the outcome desired. Most importantly, strategy consists of *conditions.* "These conditions form the basis for decisions that ensure operations progress consistently toward the objectives that represent the desired state of the operational environment when operations end."[100] The essence of strategy is how the means available can be used to achieve the political goals sought, and the specific conditions that exist will certainly impact the ability to do so.

[99] Mills, "Applying Design at Us Army Central/Third Army: What Theory Recommends and What Reality Demands," 30.
[100] Joint Warfighting Center, "Design in Military Operations: A Primer for Joint Warfighters," The Joint Warfighting Center Joint Doctrine Series, Pamphlet 10 (2010), p 9.

Joint Publication 5-0 also notes the conditions encountered are likely to affect the design of strategy.[101] Finally, in this same design school of thought, Edward Hayward uses the terms "elements" or "assemblages" for the products that flow from a special theory of action.[102]

In short, there are no less than eight terms that grapple with the hybrid nature of strategic ways—the blend of concept and action. Different strategic thinkers use different terms to represent the ways that means are used to achieve ends. Seen together, these terms acknowledge the meaning of ways as a hybrid of concept and action.

1. Coherent actions
2. Key descriptors of systems change
3. Key strategic factors
4. Key factors for success
5. Stratagems
6. Conditions (meaning ones that are set; not conditions that already exist)
7. Strategic effects
8. Elements/assemblages

These terms refer to outputs of their respective frameworks that dictate the ways nations use means to achieve ends. The central idea in these eight terms is how theory provides logic to select actions for a strategy. The actions, or COAs, then make up the basic elements of a strategy.

In the final analysis, the ways are the product or anthesis of the whole theory-to-strategy model. Clausewitz captured this perfectly in his description of what theory does for the strategist facing a real-world situation.

> Theory cannot equip the mind with formulas for solving problems, nor can it mark the narrow path on which the sole solution is supposed to lie by planting a

[101] JP 5-0. Joint Operation Planning, 26 December 2006, III-9f, III-12b.
[102] Edward P. W. Hayward, "Planning Beyond Tactics: Towards a Military Application of the Philosophy of Design in the Formulation of Strategy," School of Advanced Military Studies, U.S. Army Command and General Staff College, 2008, 25-26.

> hedge of principles on either side. But it can give the mind insight into the great mass of phenomena and of their relationships, *then leave it free to rise into the higher realms of action*. There the mind can use its innate talent to capacity, combining them all so as to seize on what is right and true as though this were a single idea formed by their concentrated pressure – as though it were a response to the immediate challenge rather than a product of thought.[103]

Theory is the primary method for channeling the power of ideas into coherent ways to pursue an opportunity or solve a national security problem in "the higher realms of action." In this manner, ways are the alchemy that fires in the theory-to-strategy nexus. This research points toward how these levels of theory are actually pulled together by an ancient skill that is seldom connected to strategy.

III. Hypothesis as the Skill of Tailoring Theory

Theory advances via hypothesis. A hypothesis[104] is "a supposition or proposed explanation made on the basis of limited evidence as a starting point for further investigation."[105] The supposition of a hypothesis is based on premises—statements of fact—from existing theory and tentative assumptions about unknowns.[106] Compared with logical conclusions, a hypothesis entails a different role for assumptions. Deductive and inductive conclusions are based on premises, and assumptions are *not necessary* (but may indeed be present in an argument). A hypothesis, on the other hand, contains both premise and assumption but the assumptions are *essential* to express unknowns involved

[103] Clausewitz, *On War*, 578 (emphasis added).
[104] For grammatical clarity, the construction "a" hypothesis and "an" hypothesis are both acceptable, the former being more American and the later being a British construction. For example, see the *American Heritage Dictionary* definition of "nebular hypothesis."
[105] Oxford Dictionaries, "hypothesis," OxfordDictionaires.com, accessed May 27, 2015, http://www.oxforddictionaries.com/us/definition/american_english/hypothesis.
[106] For a longer definition see also *The Compact Oxford English Dictionary*, 2ed. (Oxford: Oxford University Press, 1993), 582. "A supposition or conjecture put forth to account for known facts; a provisional suppostion from which to draw conclusions that shall be in accordance with known facts, and which serves as a starting point for further investigation by which it may be proved or disproved and the true theory arrived at."

in the educated guess.[107] The importance of building hypotheses pervades the classics. Thinkers like Plato, Aristotle, Hippocrates, Copernicus, Aquinas, Bacon, Pascal, Descartes, Newton, Locke, and Kant all devoted time to articulate aspects and the importance of this skill called hypothesizing.[108]

In all disciplines, hypotheses are formed using a mix of induction and intuition. Einstein captured this hybrid thought process as "intuition supported by being sympathetically in touch with experience."[109] *Induction* is the process of inferring a generalization from particular instances. John Boyd regarded this procedure as a fundamental to all competition—a process he called, "creative induction" or "synthesis."[110] *Intuition* is also a form of logic but its premises are in the unconscious mind. The "gut feeling" seems illogical because one is only receiving the conclusion—the premises are buried in the unconscious mind.[111] When combined, induction and

[107] For more information on checking the validity of assumptions see, United States Government, "A Tradecraft Primer: Structure Analytic Techniques for Improving Intelligence Analysis," (no place or publisher provided), 7-10.
[108] Mortimer J. Adler, ed. *Synopticon for the Great Books of the Western World* (Chicago: Encyclopedia Britannica, Inc., 1990), 576-587.
[109] Gerald Holton, *Thematic Origins of Scientific Thought: Kepler to Einstein* (Boston: Harvard University Press, 1988), 395.
[110] Destructive deduction and creative induction are defined in John Boyd's, "Destruction and Creation: A Discourse on Winning and Losing," accessed Jan 3, 2015, (http://www.goalsys.com/books/documents/DESTRUCTION_AND_CREATION.pdf), 1-3. "To make these timely decisions implies that we must be able to form mental concepts of observed reality, as we perceive it, and be able to change these concepts as reality itself appears to change…There are two ways in which we can develop and manipulate mental concepts to represent observed reality: We can start from a comprehensive whole and break it down to its particulars or we can start with the particulars and build towards a comprehensive whole… we can see that such an un-structuring or destruction of many domains—to break the correspondence of each with its respective constituents—is related to deduction, analysis, and differentiation. We call this kind of un-structuring a destructive deduction…Going back to our idea chain, it follows that creativity is related to induction, synthesis, and integration since we proceeded from unstructured bits and pieces to a new general pattern or concept. We call such action a creative or constructive induction."
[111] Gavin DeBecker, 1997, *The Gift of Fear* (Dell Publishing, New York), 12-13, 25-26. For further reading on the unfolding subject of intuition see Peter Klein's *The Power of Intuition* (2003), Malcom Gladwell's *Blink* (2005), and Daniel Kahneman's *Thinking Fast and Slow* (2011).

intuition follow the findings of Daniel Khaneman, who labels these two kinds of thought "System 1" and "System 2" thinking.[112]

Creating strategy uses this hybrid thought process to build a sound hypothesis of what will work. There are three reasons hypothesis is central to strategy making. First, as illustrated in the theory-to-strategy model, developing strategy is a theoretical endeavor. Each level of theory may trigger a hypothesis about what will work in the current context.

Second, since strategy deals with the future, it is always a guess.[113] Assumptions become inherent to strategy because they are the only way to grasp unknowable future variables subtending the strategy. The strength of the hypothesis, therefore, can only be partially tested before implementation amidst the vicious action-reaction cycles of the real world. Making the best guess—or designing the best strategy—comes down to making an *educated* guess about how to transform the present into the desired future by using theory to build a hypothesis.[114] This approach to creating a strategy is a practical technique, since nearly every strategy student has constructed hypotheses for other subjects.

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[112] Daniel Khaneman, *Thinking, Fast and Slow* (New York: Farrar, Straus and Giroux, 2011), 13-14, 19-30.
[113] Thomas Hughes, personal conversation, 10 July 2011. Dr. Hughes at the School of Advanced Air and Spacepower Studies asked, "Isn't all strategy really a guess?" This query led me to research who used a hypothesis—an educated guess—in developing the ways portion of a strategy. The literature review in this paper summarizes this research.
[114] For amplification in the philosophy of science see C. G. Hempel, *Fundamentals of Concept Formation in Empirical Science* (Chicago: The University of Chicago Press, 1952), 36. "An adequate empirical interpretation turns a theoretical system into a testable theory: The hypothesis whose constituent terms have been interpreted become capable of test by reference to observable phenomena. Frequently the interpreted hypothesis will be derivative hypotheses of the theory; but their confirmation or disconfirmation by empirical data will then immediately strengthen or weaken also the primitive hypotheses from which they were derived."

Third, good strategy must come to grips with vast aspects of reality in order to work with it rather than against it. The strategist must roam far outside of general strategic theory[115] to deal with phenomena like macro-economics, international relations, political science, physics, history, sociology, psychology, and philosophy. Further, in these diverse realms of understanding one must distinguish the important from the unimportant—a phenomena in engineering that Walter Vincenti describes as navigating our "blindness to variation and uncertainty in selection."[116] The vast multi-disciplinary nature of strategy produces an inherently theoretical endeavor. Several domains of theory combine via hypothesis to approximate the widest possible range of reality for a sound strategy. As such, tailoring theory via hypothesis serves as an essential skill for the strategist. This assertion will be explored further in Chapter 5.

IV. Good Theory, Bad Theory

The following case studies examine the role of theory in strategy development, and beg the question, what distinguishes good theory from bad theory? Clausewitz observed that good theory is "practical" and "useful."[117] He also stated that sound theory should "light our way, ease our progress, train our judgment, and help avoid pitfalls."[118] Hal Winton remarked that coherent theory defines, categorizes, explains, connects (related fields/ideas) and anticipates.[119] Colin Gray added: "Theory provides insights and

[115] For a definition of general strategy theory see Colin Gray, *The Strategy Bridge: Theory for Practice* (New York: Oxford University Press, 2010), 264.
[116] Walter G. Vincenti, *What Engineers Know and How They Know It: Analytical Studies from Aeronautical History, Johns Hopkins Studies in the History of Technology [New. Ser., No. 11]* (Baltimore: Johns Hopkins University Press, 1990) 249.
[117] Rumelt, *Good Strategy, Bad Strategy*, 144.
[118] Rumelt, *Good Strategy, Bad Strategy*, 141.
[119] Harold R. Winton, "An Imperfect Jewel: Military Theory and the Military Profession," in *SAASS 600 Course Paper* (Montgomery, AL: School of Advanced Air and Space Power Studies, 2010), 4.

questions, not answers."[120] The combined notions of these three thinkers provide a solid picture of what constitutes sound theory.

Yet even very solid can be a two-edged sword depending on how it is used. Theory can both enlighten and blind. In *The Essence of Decision*, the authors Graham Allison and Philip Zelikow view the Cuban Missile Crisis through three perspectives and come to an interesting conclusion about the role of theory in designing strategy. They ask, "Do our theories shape the questions we ask, or the answers we get to common questions?" Their answer is "both."[121] The work of Allison and Zelikow affirm the two-edged sword dimension of theory as both enlightening and blinding. This research explores how to maximize what theory does *for* strategists and minimize what theory can do *to* them. A great contribution that theory can make to strategy is to provide the logic of the ways that steer it to an innovative path.

V. Case Study Overview

When the Wright brothers first flew in 1903, they would have had difficulty imagining the atomic bombing of Hiroshima and Nagasaki only 42 years later. As they trained their attention on simply staying aloft for 852 feet in a 20-knot wind, men on the moon in 66 years was unfathomable. A century after Kitty Hawk, a drone called the MQ-9 Reaper was capable of flying on the other side of the world, providing observation and multiple 500 pound bombs on demand with stunning accuracy. Such has been the character of American airpower. The diversity of its transformations in a short period of

[120] Gray, *Modern Strategy*, 128.
[121] Graham T. Allison and Philip Zelikow, *Essence of Decision: Explaining the Cuban Missile Crisis*, 2nd ed. (New York: Longman, 1999), 387.

history makes airpower a perfect subject for studying the role of ever changing theory amidst the constants of war.

There are important limits to using airpower strategies as case studies. First, airpower strategy is but one subset of military strategy, which itself is a subset of grand-national strategy. This devolution begs the question about the scale to which these findings can be extrapolated. I contend that the theory-to-strategy model is like a fractal that applies across the services and levels of strategy, and the synthesis chapter will amplify that argument using Containment and Apple's i-Revolution as examples.

Second, airpower history is not without controversy. Just because the role of theory in strategy-making can be established in greater detail, it does not follow that this role was beneficial in each case. The question of how to best use American airpower is marked by a lack of consensus about when bombing is beneficial.[122] Applying airpower against the Islamic State in Iraq and the Levant (ISIL) is just the latest example of the debate. On the one hand, skeptics reject the thought airpower can shape the ground battle in a way consistent with the President's political objectives. This group includes those who automatically disdain the perception of "operational concepts masquerading as a strategy."[123] On the other hand, many "believers" see airpower solutions as quick, cheap, and efficient. This perspective may emanate from an increasing cultural preference for quick solutions to profound problems in world order,[124] or a historical leaning toward the same.[125]

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[122] Mark Clodfelter, *The Lmits of Air Power: The American Bombing of North Vietnam* (Lincoln: University of Nebraska Press, 2006).
[123] Paul Darling & Justin Lawlor, "Married to Clausewitz but Sleeping with Jomini: How Operational Concepts Masquerade as Strategy, and Why They Must", *Infinity Journal Online*, Article 4, vol 2, issue 3, accessed 21 Nov 14, 1239.
[124] Tom Hughes, "The Cult of the Quick," *Aerospace Power Journal* (December 2001).
[125] Colin S. Gray, "History and Strategic Culture," in *The Making of Strategy: Rulers, States, and War*,

Still, airpower has a certain ease of use for a President to apply toward political objectives. The range, reach, and persistence of airpower enables the US to be practically anywhere, at any time, for any level of intensity ranging from tens to hundreds of sorties per day. The Mt. Sinjar rescue from August 8-14, 2014 is a classic modern example. Approximately 30,000 Yazidis and other ethnic minorities took refuge on Mt. Sinjar in northwestern Iraq while surrounded by ISIL forces.[126] While many Yazidis lost their lives on the way to the mountain, bombing and humanitarian airdrops combined in a six-day solution to stop what the President described as an ongoing genocide.[127] Socially, these applications of American airpower seem to comfort the American people showing them that options are available that do not involve placing US troops in combat amidst what could unfold into a broader Sunni-Shi'ite civil war.

Two case studies from different eras supply evidence for this research—each case has two different theories of action to compare. The World War II case study uses the "Industrial Web Theory" principally identified with the U.S. Army Air Corps and "Morale Effect Theory" commonly ascribed to the English approach in World War II. In reality, both the U.S. and England used each of these theories of action to hypothesize at different points in time based on the changing character of war. Industrial Web and Morale Effect theories appear side-by-side in chapter 2 since they share a common context. The Post-Cold War case study uses the "Enemy as a System" theory of action from Desert Storm (1991) and "Crony Attack" from Allied Force (1999). These theories

edited by Williamson Murray, MacGregor Knox, and Alvin Berstein (New York: Cambridge University Press, 1994), 589-598.

[126] "The Guardian", 14 August 2014, accessed 21 Nov 2014, 1130.

[127] Airpower could have also been used to evacuate the Yazidi refugees from Mt. Sinjar in a Berlin Airlift style mission with mobility air forces. This option was simply not chosen as one of several ways we attempted to limit US involvement in the cauldron of the Levant.

receive their own chapters for while they are the first two large conflicts after the Cold War, each conflict had a very different context. Finally, chapter 5 will briefly introduce "The Afghan Model" and the "F3EAD" theory of action from the 9/11 era simply to foster more synthesis about the operation of the theory-strategy nexus represented by the Upstream Model.

This study suggests success in applying American airpower depends less on its inherent nature and more on how well strategists tailor theory to the changing character of war. This research puts a spotlight on an important relationship: the role of theory and its subsequent impact on strategy design—how theory affects the ways that political and military leaders will ultimately employ military power to achieve a nation's war aims. The conclusions from this analysis are intended to capture how theory shapes the selection of ways in strategy by using a model. The connection between theory, strategy and the use of hypothesis should be less mysterious in strategy-making in order to clarify this critical pathway for the power of ideas.

CHAPTER 2
TRANSFORMING THEORY TO STRATEGY IN WORLD WAR II

World War II was the last example of total war between whole societies virtually prepared to fight to the last living person. In that context, alternative bombing strategies were developed in which nations braced to fight until the other side faced national exhaustion. Nested within this level of military strategy, multi-disciplinary specialists went to work looking for an edge in strategy. Economics, industrial engineering, psychology and other disciplines shaped strategy ranging from England's "Air Attack on the Dams Committee" to the composition of the civilian Committee of Operations Analysts (COA) in the U.S.

At the paradigm level, allied air forces focused on the paradigm of strategic bombing which had deep roots in World War I and discoveries surrounding what was possible by controlling the air domain with the invention of the airplane and bombs. Within the paradigm of strategic bombing existed two distinct schools of thought that fed different theories of victory: morale effect theory and industrial web theory. Both England and the United States touched upon each school of thought as they navigated the changing character of war and the stark differences of war in Europe versus war in the Pacific. Throughout the war, there were fascinating deliberations and vacillations that ultimately demonstrate the power of theory upon the selection of ways from one context to the next over the course of the war.

World War II began less than 40 years after the airplane was invented. This chapter explores how theory affected the development of strategy within the strategic bombing paradigm of World War II. In the end, two theories of action with three

examples each reveal how the basic Upstream Model worked through the logic that Allied strategists used to determine the ways that airpower could help achieve political objectives given the character of the war they faced. The Industrial Web and Morale-Effect theories provide windows showing the impact that theory can have on the design of airpower strategy. The visions that emerged from them in the aftermath of the war have continued to highlight the fundamental importance of the four levels of theory in strategy development.

Early thinkers explored how the attributes of airpower might add a new dimension to general strategic theory. The airplane and bomb were not simply new technology—they ushered in a distinctively different "grammar" for waging war.[128] Colin Gray captured this new grammar with seven fundamental attributes of airpower. The *ubiquity* of air surrounds 100% of the world. Thus, air operations create an entirely *new flank*—overhead—in combat. The *range and reach* of air operations grant access to precious targets that need not be earned by prior defeat of land or surface forces. The *speed* achievable through the air has nothing like the geographical barriers common to movement on land and sea. Geographically *unrestricted routing* via the air provides various attack angles that create "an all-vector menace." The *combined vertical and horizontal dimensions* of airspace yield superior and prismatic observation over continental or maritime horizons. Airspace's same multi-dimensional property provides unprecedented *flexibility to concentrate force rapidly and adaptively* at seemingly

[128] Clausewitz, *On War*, 605. For Clausewitz, physics, mechanics and mathematics combined to produce war's "grammar," which commanders in turn used to achieve its "logic"—the political objectives sought.

decisive points.[129] The distinctive possibilities and physics of war in the air quickly captured the imagination of early airpower theorists with these fundamental attributes.

Manifestos as General Strategic Theory for Airpower

Inspired by the wartime potential of the airplane and bomb, theorists developed airpower manifestos around the world from 1912-1926. In Italy, Giulio Douhet penned a lesser-known work in 1912 called *Rules for the Use of the Airplane*, which captured lessons from the Italian-Turkish war.[130] After World War I (WWI), Douhet wrote his most famous work, *The Command of the Air* (1921). He concluded that the airplane shifted the character of war toward the offensive by giving the advantage to those who commanded the air.[131] Further, command of the air (like Alfred Thayer Mahan's "command of the seas") meant being in a position for victory by having freedom of action to hold nearly every enemy object at risk—especially popular support for the war effort.[132]

Early British thought about airpower stemmed from the experience of World War I. By 1915, England's cities were on the receiving end of strategic bombardment by German Zeppelins, and attacks by Gotha and Giant bombers followed.[133] The next year, Britain's Hugh Trenchard trumpeted theory about the cumulative morale effect of bombing enemy cities. In March 1917 the Royal Flying Corps field manual stated: "the

[129] Colin Gray, 1998, *Explorations in Strategy* (London: Praeger, 1998), 67-71 (italics added).
[130] Barrett Tillman, *Whirlwind: The Air War Against Japan 1942-1945* (New York: Simon and Schuster, 2010), 9.
[131] Giulio Douhet, *The Command of the Air*, 1921; translated by Dino Ferrari. Reprinted as *The Command of the Air* (Tuscaloosa: The University of Alabama Press, 2009), 30.
[132] Douhet, *The Command of the Air*, 23-24, 28.
[133] Randall T. Wakelam, *The Science of Bombing: Operational Research in RAF Bomber Command* (Toronto: University of Toronto Press, 2009), 12.

morale effect produced by an airplane is also out of all proportion to the material damage which it can inflict."[134] Thus, the Morale-Effect Theory of strategic bombing had roots from Douhet and Trenchard.

On August 17, 1917, the British Commonwealth general and philosopher Jan Smuts published an influential study of airpower. The "Smuts Memo" called for four different functions of an air force to justify creating an independent Royal Air Force (RAF): observation (a.k.a "ISR" for intelligence, surveillance and reconnaissance), attack aviation (a.k.a "CAS" for close air support), strategic bombers, and air defense (air-to-air fighters).[135] Six months after this field manual was printed, British Major Lord Hardinge Goulborn Tiverton captured the concept of *selective targeting* of German industry and emphasized the general strategic principle of concentration.[136] In May 1918, Brigadier General C.L.N. Newall wrote *The Scientific and Methodical Attack of Vital Industries*. This work called for larger scale, long range bombing and selective targeting much like Tiverton. Thus, what would become strategic bombing's Industrial Web Theory had "Tivertonian" roots, carefully watered by the instructors at the US Air Corps Tactical School.

In Japan, Tsutomu Isobe wrote a 1918 airpower manifesto, *War in the Air*. Much like Douhet, he developed a critical proposition that has become a given in all conflicts involving airpower: the meaning of air superiority. Isobe asserted if a nation could

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[134] Tami Davis Biddle, *Rhetoric and Reality in Air Warfare: The Evolution of British and American Ideas About Strategic Bombing, 1914-1945* (Princeton: Princeton University Press, 2002), 76-77.
[135] Lee Kennett, *The First Air War 1914-1918* (New York: The Free Press, 1991), 86. Functional specialization of aircraft began in earnest throughout WWI. Kennett documented formal specialization in Germany and England in 1915. Germany called close air support aircraft "working units," while air-to-air and reconnaissance aircraft were in "combat units." Before the existence of the RAF, England placed bombers and air-to-air fighters in an "Army Wing" while reconnaissance aircraft were organized in a "Corps Wing."
[136] Biddle, *Rhetoric and Reality in Air Warfare*, 38

control the air, this dominance would facilitate land and maritime operations.[137] Douhet, in contrast, believed that controlling the air would obviate the need for armies and navies, a prospect that Nakajima Chikuhei, a young Japanese naval officer, articulated in January 1915. He predicted that the airplane would become the decisive weapon of warfare.[138] Japanese statesmen also saw the airplane as a political instrument. Kaneko Kentaro was a Harvard graduate and statesmen of the Meji Revolution era in Japan. In a 1912 letter to Isoroku Yamamoto (the Pearl Harbor mastermind), Kentaro described the massive chaos that would result from attacking ports with submarines and airplanes simultaneously.[139] By 1920, Japan was one of three nations with aircraft carriers, in addition to the US and UK.[140] Airpower had stirred the imagination but tremendous amounts of experience and experimentation would be required to make any of these visions possible.

In the US, Billy Mitchell published his *Winged Defense* in 1925, a manifesto still read by US Airmen 90 years later. He argued an independent air force would give America global reach and global power.[141] Mitchell also favored attacking the heart of an enemy country and destroying essential "systems" like transportation and oil—a concept that has endured as illustrated by three of the first four special theories of action in this research. In 1926, William C. Sherman wrote *Air Warfare*. This work began to

[137] Mark R. Peattie, *Sunburst: The Rise of Japanese Naval Air Power, 1909-1941* (Annapolis: Naval Institute Press, 2001), 11. Douhet is famously recognized for this point about how command of the air led to command of the other mediums in conventional warfare. As Isobe's manifesto preceded Douhet's by three years, one could argue that this critical argument about air superiority around the world vice just in the mind of Douhet.
[138] Mark R. Peattie, *Sunburst: The Rise of Japanese Naval Air Power, 1909-1941* (Annapolis: Naval Institute Press, 2001), 11.
[139] Peattie, *Sunburst,* 11.
[140] Peattie, *Sunburst,* 21.
[141] William "Billy" Mitchell, *Winged Defense: The Development and Possibilities of Modern Air Power—Economic and Military* (New York: G.P. Putnam's Sons, 1925); reprinted (Tuscaloosa: University of Alabama Press, 2009). Global reach is described on pages 4, 26, 38, 126, 130. Global power is explained on pages 4, 126.

document the "industrial fabric" theory that underpinned American bombing in World War II. Sherman's work also rejected bombing population centers for the sake of breaking enemy will, in contrast to the notions stressed by Douhet and Trenchard.[142] This timing mattered. In 1926 the Air Corps Tactical School (ACTS) was created in the US. At this school, a special theory of strategic bombing incubated and later flourished to guide American air strategy in World War II.

All together, theorists across the world combined to specify four general categories of value for the airplane in combat.

1. Observation (intelligence gathering)
2. Air-to-air fighting (then called "pursuit")
3. Bombing (with four varieties to be discussed)
4. Airlift (in the form of airborne infantry and materiel)

Each category represented an exploration in general theory for the use of the airplane in war.[143] The power of the airplane for observation (and previously of the balloon) was the "official" lesson of World War I in the U.S. according to I.B. Holley Jr. The dramatic value of airborne observation made it difficult for other applications of airpower to win broad acceptance as paradigms—the level of theory beneath general strategic theory in the Upstream Model.[144]

The category of air-to-air fighting reached a new scale in 1916's Battle of Verdun.[145] Aerial combat was a hazardous business filled with all of the passion known

[142] In 1936, Soviet Field Marshall Mikhail Tuchachevskii would call the idea of breaking an enemy's will via bombing as "pernicious military idealism."
[143] Gray distinguishes two types of general theory. "General theory of strategy" refers to repeating phenomena in strategy "independent of all historical" context. The other type is like that described by these airpower categories which Gray calles, "specific general theories of strategy for particular mitliary instruments or functions (e.g. for spacepower, cyberpower, sea power, special operations) valid for all times, places, and circumstances." See Gray, *Strategy Bridge*, 20.
[144] I.B. Holley Jr., *Ideas and Weapons* (New Haven: Yale Universtiy Press, 1953), 173-174.
[145] Alistair Horne, *The Price of Glory: Verdun 1916* (London: Penguin Books, 1993), 199.

to war on the ground. Many pilots saluted their victims as they plunged to the earth saying, "You today, me tomorrow."[146]

After the development of observation and air-to-air combat, four bombing categories materialized. All major nations in Europe produced bombers during the war while searching for bombing applications.[147] One early definition of these categories appeared in a 1917 "French Air Service Note,"[148] which explained each category of bombing in terms of contributions to firepower:

1. in the fight (close air support or CAS)
2. enroute to the fight (air interdiction or AI)
3. beyond the fight (strategic attack[149])
4. the threat of bombing (deterrence)

These bombing categories have endured and associated concepts from the manifestos gave birth to paradigms within each category that still play an important role in the development of air power strategy.

Within these four bombing categories, various paradigms branched out. The two theory examples used in this chapter—*Moral-Effect and Industrial Web*—grew within "strategic bombing" doctrine. Theories used in the following chapters—*Enemy as a*

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[146] Quoted in Lee Kennett, *The First Air War 1914-1918* (New York: Simon and Schuster, 1991), 148.
[147] A.C. Grayling, *Among the Dead Cities: The History and Moral Legacy of the WWII Bombing of Civilians in Germany and Japan* (New York: Walker and Company, 2006), 124.
[148] Kennett, *The First Air War*, 54. The phrases used in the French Air Service note correspond generally to categories we use today. "Battlefield Bombing" referred to Close Air Support. "Distant bombing" referred to interdiction. "Industrial Bombardment" referred to strategic attack beyond the fielded forces. "Reprisal bombing" is the most poorly correlated to terms of today but is related to deterrence bombing.
[149] Air Force Doctrine Document 2-1.3, *Counterland Operations* (2006), 12. Air Force doctrine splits counterland operations into the two broad categories of CAS and AI. Strategic attack or ATK is also explained in doctrine as something separate and distinct from CAS and AI. The 2006 AFDD 2-1.3 explained, "Strategic attack operations directly target enemy centers of gravity such as leadership, conflict-sustaining resources, and/or strategy. Targets may include strategic C2 nodes, munitions plants, heavy industry, energy production, or weapons of mass destruction (WMD). Thus, in one sense, strategic attack disrupts or destroys such targets at the source, while counterland operations normally target operational fielded forces and their supporting infrastructure in the field." Strategic Attack also has its own Air Force publication (AFDD 3-70) and an un-ratified joint version (JP 3-70).

System and Crony Attack—grew in the emerging paradigm of "strategic attack" (this paradigm distinction is elaborated in Chapter 3). CAS and AI thinkers also gave birth to distinctive paradigms. The notions of John Slessor,[150] Pete Quesada,[151] George Kenney,[152] and Otto Weyland[153] led paradigm construction for the mastery of close air support and interdiction. In short, the airplane, bomb, and aerial gunnery combined to stimulate global and active theorizing spanning the levels of the Upstream Model to include these four bombing categories in general theory (for a sense of this vast theorizing see Appendix 2, "An Airpower Concept Timeline from the Dawn of Aviation to 1945").

The Strategic Bombing Paradigm

The strategic bombing paradigm is a collection of premises and assumptions about an application of air power that many theorists deemed its "best" use. Seven basic assumptions are foundational to this paradigm. Strategic bombing:

1. Goes over, not through enemy forces.
2. Creates a quicker end of the war and thus, fewer deaths for all concerned—hereafter called the progressive ideal.[154]
3. Represents an indirect approach.
4. Is an offensive type of warfare.[155]
5. Takes advantage of the new depth of the battle space.[156]

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[150] John Slessor, *Air Power and Armies* (Alabama: The University of Alabama Press, 1936 [2009]).
[151] Thomas A. Hughes, *Overlord: General Pete Quesada and the Triumph of Tactical Airpower in World War II* (New York: The Free Press, 1995).
[152] Thomas E. Griffith Jr., *MacArthur's Airman: General George C. Kenney and the War in the Southwest Pacific* (Kansas: University Press of Kansas, 1998).
[153] M.J. Chandler, *General O.P. Weyland: Close Air Support in the Korean War* (Maxwell AFB, AL: Air University Press, 2007).
[154] Mark Clodfelter, *Beneficial Bombing* (University of Nebraska Press, Lincoln & London, 2010), 238.
[155] Craven and Cate, *Army Air Forces*, 1:51.
[156] The phase "Deep Battle" comes from Mikhail Tuchachevskii in the Soviet Army. He had a fascination with the role of the airplane in new warfare. In addition to Deep Battle, he coined the phrase "Airmechanization" which was a pseudonym for combined arms warfare. He also had very clear writings about the importance of designating aircraft for strategic attack.

6. Attacks the whole of the "enemy national structure."[157]
7. Forces an enemy to divert resources from offense to air defense.

These propositions were reflected at the Air Corps Tactical School in a 1926 reference to "G.H.Q (General Head Quarters) Bombing." This term appeared in an ACTS pamphlet called *Bombardment,* and described airpower dispatched "from the top" for time-critical, strategic purposes. "Due to the mobility, range, flexibility, and firepower of bombardment, it is essentially a weapon of G.H.Q."[158] Elsewhere the ACTS authors observed how missions like critical resupply and retaliation for attacks on population centers were "conducted under the bombardment in the G.H.Q. reserve and under the direction of the chief of the Air Service."[159] Thus, right after World War I there was an argument that the most effective use of bombing demanded centralized control from an airman commanding the bomber force free from requirements in other critical airpower applications like CAS or AI.

The following chart (Figure 5) previews the examples used throughout this chapter to trace the role of theory in designing airpower strategy. The two special theories of action explored in this chapter—the Industrial Web and Morale-Effect theories—derive common attributes from the strategic bombing paradigm. Examples of the Industrial Web Theory include bombing the sub-pens, the Dambuster Raid, and the Oil Plan. Examples of the morale effects theory include the bombing of Hamburg, the firebombing of Japan, and the atomic bombing of Hiroshima and Nagasaki. Some air power ways selected during World War II do not fit into either Moral Effect nor

[157] Craven and Cate, *Army Air Forces*, 1:51-52.
[158] Air Corps Tactical School, *Bombardment* (Air Corps Tactical School, Langley, VA, 1926), 4.
[159] ACTS, *Bombardment*, 73.

Industrial Web theories as discussed in Appendix 2, “World War II Paradigm Anomalies."

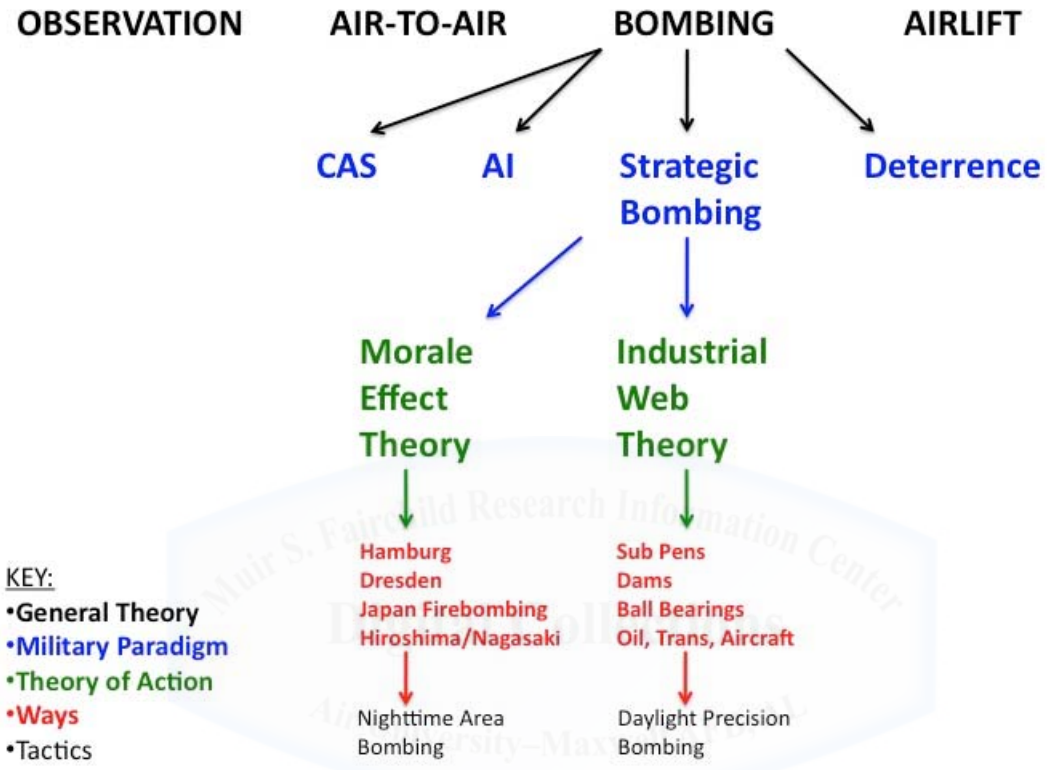

Figure 6: Theory to Airpower Strategy in World War II (Source: original).

Two Competing Theories of Action: Morale Effect and Industrial Web Theories

From the early works, two basic schools of thought about strategic bombing emerged. Douhet (Italy) and Trenchard (Britain) were impressed by the airplane’s ability to attack not just armies but whole societies. This theory about attacking society to produce a morale-effect led to the area bombing of cities as a way to compel an enemy’s surrender. The logic was bombing the cities would break civilian will to fight and induce capitulation because civilian morale was fragile. The theory further assumed that

bombing civilians was justified because they were essential to produce the means/armaments of war; hence, they were legitimate targets in total war. This Morale-Effect Theory can be summarized as:

1. Breaking enemy civilian will is possible via the traumatic impact of bombing.
2. When the will of the people breaks they will demand an end to the war and the government will either comply or be overthrown.
3. Attacking industrial/residential areas in cities has two-for-one value—the same bombing can disrupt vital war production while also breaking civilian will.

The upstream concepts in this theory are depicted in Figure 7.

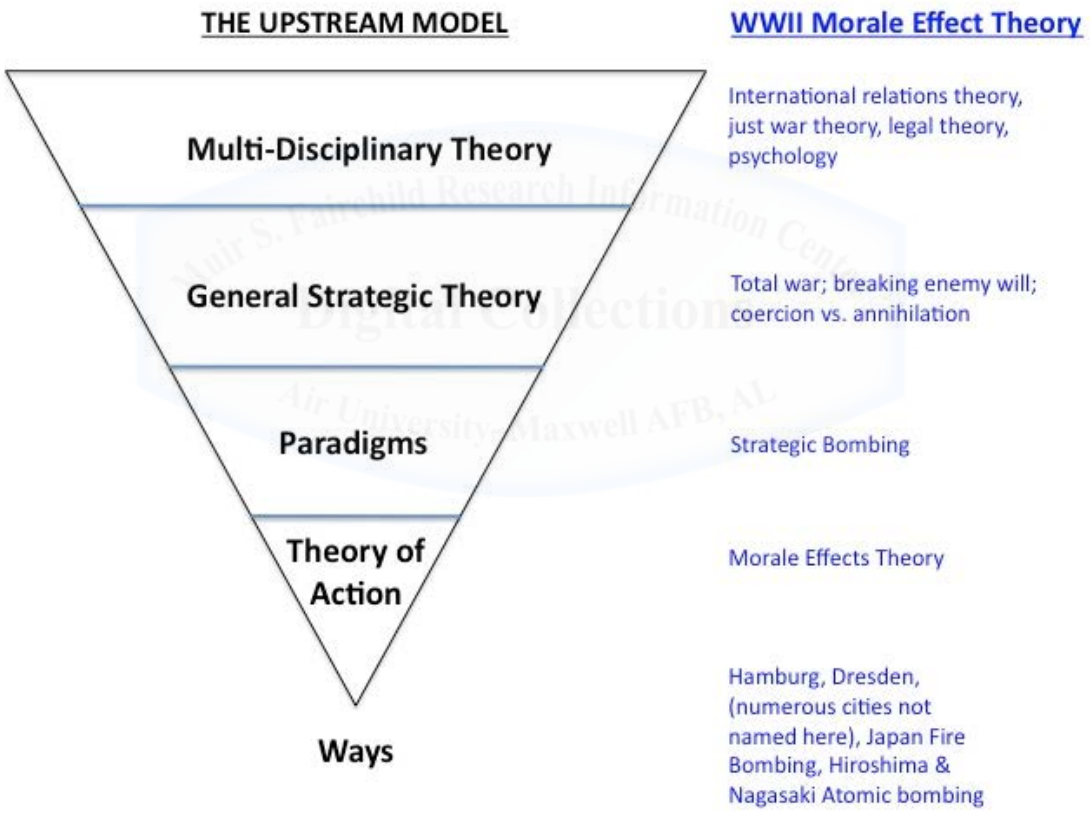

Figure 7: The Upstream Model for Morale Effect Theory

The second school of thought originates from the Gorrell Report of 1918. Lieutenant Colonel Edgar S. Gorrell's World War I experiences[160] served to awaken American Airmen to the military potential of strategic bombing. In 1918, Gorrell published a report on the prospects for bombing Germany. Influenced by Tiverton, he captured many notions found in the new strategic bombing paradigm.[161] He noted how bombing forced the diversion of enemy resources from offense to air defense. Gorrell was also impressed by the bomber's ability to impact production of war materiel.[162] In 1925, Major William C. Sherman elaborated on Gorrell's ideas in the book *Air Warfare*. Sherman used the phrase "industrial fabric" to describe the system that produced an enemy's armaments and means of war.[163] These notions eventually led to the development of Industrial Web Theory at the Air Corps Tactical School (ACTS) in the US. This theory of action was well defined by Haywood Hansell, the Army Air Forces' official history of World War II, David MacIsaac, Mark Clodfelter, and Peter Faber. Collectively, they contend that the Industrial Web Theory held:

1. Modern [conventional] war places special importance on a nation's "industrial web" and its associated economic structure.
2. A nation may be defeated simply by interrupting the delicate balance of industrial organization most vulnerable to air attack; targets include such essential industrial components as oil, rail, aircraft, electric power, ball bearings, etc.
3. The focus is industry, not the national morale. However, bombing will also disrupt national morale by destroying services essential to society.

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[160] Carl von Clausewitz, *On War* (Princeton: Princeton University Press, 1976), 77.
[161] Mark Clodfelter, *Beneficial Bombing: The Proressive Foundations of American Air Power, 1917-1945* (Lincoln: University of Nebraska Press, 2010), 8. Just as Col Edgar Gorrell was influenced by Tiverton, he was an accomplished Airman and thinker in his own right. "He transferred to the Signal Corps' Aviation Section in 1914 and then completed flight training. Two years later, as one of eleven pilots in the First Aero Squadron, he helped track Pancho Villa's band of outlaws across northern Mexico. He became the first American to fly an aircraft equipped to take automatic photographs, the first to fly an aircraft while conducting radio experiments, the first American Army officer to volunteer for a parachute jump, and one of the first officers to fly at night. He also developed the first plan for an American bomber offensive against an enemy nation."
[162] James S. Corum, *The Luftwaffe: Creating the Operational Air War, 1918-1940*, Modern War Studies (Lawrence, KA: University Press of Kansas, 1997), 89.
[163] Biddle, *Rhetoric and Reality in Air Warfare*, 140-141.

4. Future wars will begin with air action. Strategy should dictate striking at industry as early in the war as possible.
5. Attacking an enemies' vital points requires being within range of those targets.

The upstream concepts in this theory are depicted in Figure 8.

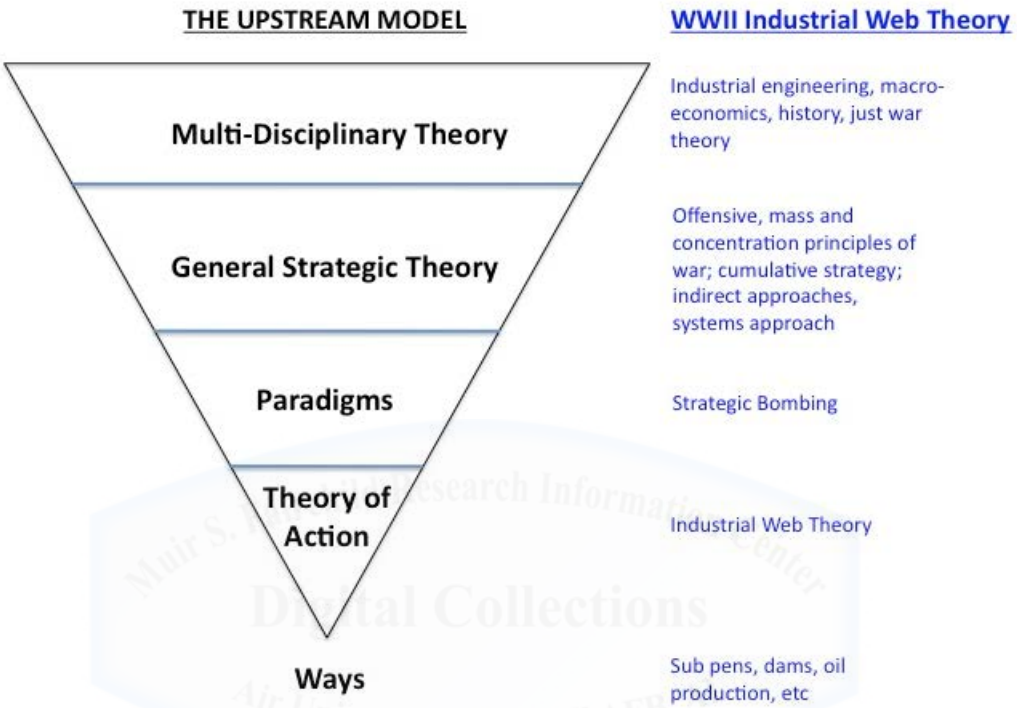

Figure 8: The Upstream Model for Industrial Web Theory

Today, when thinking of elite "innovation organizations" in government a few stand out: DARPA (Defense Advanced Research Projects Agency), Skunkworks, JSOC (Joint Special Operations Command), Big Safari, JWAC (Joint Warfare Analysis Center), and NASA. For the fledgling American Air Corps, the foundation of innovative thought was the Air Corps Tactical School (ACTS). For the bomber instructors there, strategic bombing was their paradigm while the Industrial Web became their special theory within the paradigm. The logic of that special theory dictated target selection and in turn produced the overarching ways American bombers would attack those targets. The

Industrial Web Theory was the centerpiece of American bombing strategy in World War II. Yet the evolving character of war and war's inevitable friction led to modifications in the ways that guided bombing strategy as the war escalated into total war.

Six examples of World War II bombing will illustrate how the various levels of theory affected the ways chosen to achieve strategic success:

1. The War of the Sub Pens
2. The Dambuster Raids
3. Hamburg-Style Area Bombing
4. The Oil Offensive
5. The Japan Firebombing
6. The Atomic Attacks

These six examples appear in a rough chronological order which helps to see the varied influence of theory throughout the course of the war. The impact of theory stems from combined assumptions across various levels of theory as strategists tried to adapt to the changing character of war. Strategy then flowed from the assumptions based on theory, as well as many other factors such as leadership personalities, domestic concerns, political objectives, alliance dynamics, etc. In the U.S., technology had to suit the demands of attacking the industrial webs of the Axis powers. Theory led technology in this case. The realities of how and why the Germans fought caused both theories of action (Industrial Web and Morale Effect) to merge much more than was anticipated before the war, and many of the ways selected led to widespread civilian losses, such in Hamburg, Berlin, and Dresden. Against Japan, a similar metamorphosis occurred. The resultant bombing strategies indeed reflect changes in the character of war as American and British Airmen struggled to account for those changes.

Emergent Strategy in the War of the Sub Pens

Germany changed the character of war by fighting with large-scale submarine operations in the Atlantic. The fighting became known as the Battle of the Atlantic and it was intense. Like the airplane, the submarine was an all-vector menace but from below the surface. Between 1939 and 1945, the Allies lost 72,200 seamen (naval and merchant) to the submarine war. The Germans lost 783 U-boats with 30,000 seamen--75% of all souls in their naval force.[164] This intensity was consistent with the stakes. With submarines, Adolf Hitler could suffocate supply to Great Britain and prevent the massing of enroute forces destined for an Allied invasion of Europe. British Prime Minister Winston Churchill understood this fact. He stated, "The Battle of the Atlantic was the dominating factor all through the war. Never for one moment could we forget that everything happening elsewhere, on land, at sea or in the air depended ultimately on its outcome."[165]

In the fall of 1942, the Allies turned to US strategic bombing for an answer. In July, significant American air assets diverted from Op BOLERO (the projected invasion of France) in England, to the Pacific.[166] In August, another large reallocation of assets went to Operation TORCH for forthcoming invasion in North Africa.[167] Sea lanes to support the North Africa campaign required air cover, because troop transports to North Africa were susceptible to German submarines.[168] An unintended consequence of this re-allocation to TORCH was that that the remaining American aircrews for European action had limited experience.[169] The character of war had changed further due to the German

[164] David White, *Bitter Ocean: The Battle of the Atlantic, 1939–1945* (New York: Simon & Schuster, 2008), 2.
[165] John Costello and Terry Hughes, *The Battle of the Atlantic* (London: Collins, 1977), 210.
[166] Craven and Cate, *Army Air Forces*, 2:211.
[167] Craven and Cate, *Army Air Forces*, 2:211.
[168] USSBS, German Submarine Industry Report (European Report #92), Second Edition 1947, p19.
[169] Spaatz to Arnold, 31 October 1942. Quoted in Craven and Cate, *Army Air Forces*, 2:248.

conquest of France. Important parts of the industrial-web targets were now in occupied France, which meant the possibility of killing friendly civilians through collateral damage.[170] Meanwhile, the US strategic bombing campaign against Hitler's Europe was in its infancy, having started with the Rouen marshalling yard attack in August 1942.[171] External pressure from Allies and internal pressure to build strategic bombing success compelled Army Air Forces Major General Carl A. Spaatz to divide assets and focus part of his bomber force on a new target set—German submarine pens on the Atlantic and Channel coasts. For Spaatz, the success of bombing and its contribution to an independent air force weighed on his mind.[172] He had not foreseen the diversion from industrial web targets to submarines.

In this atmosphere, two theories of action within the strategic bombing paradigm were both at play. From April 1941 to June 1942 the British had performed nighttime area bombing of the cities associated with the submarine lifecycle. British area bombing included the ports of Rostock, Lubeck, and Emden; sub-construction towns of Bremen, Hamburg, Wilhelmshaven, Kiel, and Bremerhaven; a daring raid on Augsburg which housed a submarine diesel factory; and Cologne which had sub-parts factories.[173] The British primarily sought reprisal against German cities for the night bombing of London during the 1940 Blitz, and secondarily to disrupt the submarine lifecycle—and the latter only with some luck given their dismal record of accurate bombing at night.

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[170] Craven and Cate, *Army Air Forces*, 2:239-240. "The sorrow and destruction of the French should be carefully weighed against the doubtful results to be attained from bombing at extremely high altitudes."
[171] David MacIssac, *Strategic Bombing in World War Two*, 4. Brigadier General Ira Eaker personally participated in this first U.S. strategic bombing raid. See "General Eaker Leads First U.S. Bomber Raid,"*Life*, 1942-09-14, p. 38 (retrieved November 20, 2014), despite being stung approximately 27 times while hunting the previous day. Clodfelter, *Beneficial Bombing*, 114.
[172] Craven and Cate, *Army Air Forces*, 2:236 (Source: Ltr, Eaker to Stratemeyer, 8 Oct 1942).
[173] Craven and Cate, *Army Air Forces*, 2:243.

Americans zeroed in on the aspect of "luck" or "hope" in the British attacks on morale. Then Major General Henry "Hap" Arnold accompanied President Franklin Roosevelt on an August 1941 meeting with Churchill and British military leaders on the *U.S.S. Augusta* in Placentia Bay. After listening to the British Prime Minster and others speak on subjects including successes in the Atlantic U-boat war, Arnold wrote, "British long range plan is to keep giving as little as possible in remote areas where they can meet Germans on even terms always hoping for *a break*—a *miracle*—an internal break-down of [German] morale."[174]

On the other hand, the Americans, consistent with Industrial Web theory, hoped to strike at the core of the submarine lifecycle with daylight precision bombing. This focus meant sustained strikes against building yards and factories.

Figure 9: Where to Strike? The Life Cycle of German Submarines (derived from multiple sources including Craven and Cate). Double arrows indicate back and forth movement of U-boats between those locations.

Despite having their industrial web theory to guide them (see figure 8), the lack of bombers and long-range escort fighters available compelled the Americans to settle on precision daylight bombing of sub-port facilities in France: St. Nazaire, Brest, Lorient, La

[174] Henry H. Arnold, 9 August 1941, Personal Journals, Box 2, Tile 408, Henry H. Arnold Papers, Library of Congress [emphasis added].

Pallice, and Bordeaux. The British knew that the sub pens themselves were hard to destroy (see photo). Brigadier General Ira C. Eaker, the commander

Photo 1: German Submarine Pens at Bordeaux (Source: http://en.wikipedia.org/wiki/BETASOM#/media/File:U-boat_pens,_Bordeaux,_France-1Aug2009.jpg, reprinted in accordance with fair use).

of Eighth Air Force (8AF), Bomber Command, had lost the mass he needed for deep strikes into Germany due to the allocation of bombers to the Pacific and North Africa. He was still assessing how successful the Americans could be without fighter escort due to their range limitations. Eaker's limited means told him to proceed cautiously during this timeframe.[175]

The Allies lacked consensus on how the Americans should proceed. The British Admiral of the Fleet, Sir Dudley Pound, was satisfied with the focus on the Biscay ports but recommended a target focus on the surrounding port facilities rather than the impervious sub-pens themselves. The RAF wanted to attack the building yards.

[175] Craven and Cate, *Army Air Forces*, 2:236.

Importantly, the US Navy favored anti-submarine operations and air escort in the open Atlantic. The Navy conducted such operations, and 8th Air Force bombers would have given that strategic approach more muscle. American Airmen were excited just to start bombing Germany's Europe, but they were not sure that the sub-pen ports equated to "something drastic" in the U-boat lifecycle,[176] although the sub-pen ports did fit the bottleneck concept in the Industrial Web Theory. In the UK sharp debate occurred. The British leadership was still committed to the theory of morale bombing all the way up to Churchill himself, even though they wanted desperately to destroy the submarine facilities.[177]

The Allies faced an uphill battle in this fight. In August 1942, approximately 240 German U-Boats were already underway when the war on the sub-pens began (approximately 120 training in the Baltic, and 120 wreaking havoc in the Atlantic). Further, German production was outpacing allied destruction of the U-Boats. Germany produced 15-20 per month and the Allies sank only 5-7 per month in combat—always a difficult business.[178] All combined, the precision daylight bombing of submarine ports was a compromise between industrial web theory, the intensity of the Allied problem in the Atlantic battle, British requests, and the lack of US airpower in England due to the aviation "fronts" in North Africa and the Pacific. Theories of action are usually a compromise in which theory provides only one input into the design of strategy. Yet, as American Airmen struggled to form a hypothesis that would specify the ways in which they would employ their bombers, they had little confidence in the worthwhile effects of

[176] Craven and Cate, *Army Air Forces*, 2:245, 251-252.
[177] Janusz Piekalkiewicz, *The Air War: 1939-1945* (Historical Times Inc., New York, NY), 195.
[178] Craven and Cate, *Army Air Forces*, 2:243, 244.

bombing submarine ports.[179] Industrial Web theory was meeting the reality of limited means and reach.

What followed became known as the war against the sub pens. Strategic bombing against the Biscay sub pens in France ran from the bombing directive of October 20, 1942 until June 1943. The USAAF dropped 17, 108 tons of bombs on submarine yards during the course of the war—1.7% of the tonnage dropped during the entire European conflict.[180] The bombing did indeed produce chaos and destruction in these ports. In one attack, 200 Axis workers were simply left in the rubble in order to continue submarine operations. Without water, food, electricity, and gas, the Germans began mass evacuations of all but essential personnel from the Biscay ports of Lorient and St. Nazaire.[181] But the results of these raids produced only temporary delays to German submarine operations.

One part of the sub pen hypothesis unraveled. The assumption guiding the Biscay port bombings was that they would disrupt submarine depot maintenance work. All war machines have a repair cycle. American Airmen categorized the deep maintenance and battle damage repair portions of this cycle as "being in depot." The facilities associated with the five Biscay ports all had key depot functions. American air leaders surmised that the Germans could make no practical adaptations for depot maintenance if bombing destroyed these facilities. This assumption was wrong.

Because the sub pens were so spacious and safe, the Germans moved depot maintenance into the pens themselves. Thus, the Biscay bombings had little effect on the

[179] Craven and Cate, *Army Air Forces*, 2:242.
[180] Haywood S. Hansell, *The Air Plan That Defeated Hitler* (Atlanta: Higgins-McArthur/Longino & Porter, Inc., Atlanta, 1972), 279.
[181] Randolf Bradham, *Hitler's U-Boat Fortresses* (Guilford, CT: The Lyons Press, 2005), 48.

turn-around time of the depot maintenance schedule. After his capture in 1945, German sub fleet commander Grand Admiral Karl Doenitz provided details about this depot maintenance adaptation. During Doenitz's planning session on May 4, 1943, he said, "The Anglo-Saxons' attempt to strike down the submarine war was undertaken with all the means available to them. You know that the towns of St. Nazaire and Lorient have been rubbed out as main submarine bases. No dog nor cat is left in these towns. Nothing but the submarine shelters remain."[182] Doenitz's assessment underscores the challenge of making a sound hypothesis, which is a fundamental building block of a strategy.

Hypothesizing for the Dambuster Raids

To the Germans, the dams in the Ruhr Valley were life-giving in several ways. Losing these dams would mean losing five precious commodities all at once. These dams provided drinking water, hydroelectric power for Ruhr Valley industries, the canal transportation system, and water for the steel-making process. Additionally, thousands of people lived below the dams, and breeching them would likely have a devastating impact on German morale. As a result, the Germans placed intricate layers of torpedo netting in the reservoirs to protect the dams from any air launched projectiles. The British aimed to attack a component of the German war machine that was vital for multiple reasons, and they would do so in an innovative way.

Creating a distinctive approach to destroy the German dams revealed that the British had not totally discarded the Industrial Web Theory (though they did not call it that), amidst the dominance of morale bombing. The preparation for attack on the German dams also illustrated how inventive ways could be developed *outside* normal

[182] *USSBS*, "German Submarine Industry Report," Second Edition 1947, p19.

military channels. The theory—focused on wrecking a key aspect of German military capability--was articulated and quietly advanced by a civilian engineer named Barnes Wallis.

The slow hunch to focus on dams began in 1937 in a plan known as Western Air Plan 5 (WA 5). On July 26, 1938, the dam hypothesis gathered more compelling evidence from the British when they noticed the German awareness of this vulnerability (imagery of German dam defenses). Destruction of the dams could affect all at once the water supply, flooding of transportation systems, water needed for steel production the Ruhr valley, and loss of volume needed for the internal water navigation system in Germany.[183] In response, the British formed an "Air Attack on the Dams Committee." Tests that Barnes Wallis had conducted with Dr. D. Pye encouraged this committee.[184] Barnes Wallis envisioned a bounding bomb that could skip over defenses like torpedo netting and settle against its target, where it would sink and detonate underwater like a depth charge. This bomb could provide the means required to enable the mission conceived in the July 1938 meetings.[185] But Barnes Wallis' theorizing went beyond the creation of a new bomb.

In March 1941, Wallis documented the theory of action for the dams in "A Note on a Method of Attacking the Axis Powers." He identified axioms as premises and assumptions upon which the strategic concept would turn and work. Axiom #3 contained straightforward industrial web logic:

1. Axiom 3: POWER IS DEPENDENT ON THE SUPPLY OF NATURAL

[183] Alan Cooper, *The Dam Buster Raid: A Reappraisal, 70 Years On* (South Yorkshire, England: Pen & Sword Aviation, 2013), 1.
[184] Cooper, *The Dam Buster Raid,* 10.
[185] Cooper, *The Dam Buster Raid,* 1.

STORES OF ENERGY SUCH AS COAL, OIL AND WATER (WHITE COAL).

2. Power, upon which the continued functioning of industry depends, is only available from natural or adapted resources in the form of coal and oil fields, hydro-electric barrage systems and underground storage tanks for oil.
3. If Strength rests in dispersal, concentration is weakness; and concentration is a marked characteristic of the natural or artificial stores from which supplies of power are derived. Coalfields, Oil Fields and districts suitable for development as hydro-electric catchment areas and underground storage tanks for oil are all highly localized, and are impossible to disperse.
4. If their destruction or paralysis can be accomplished THEY OFFER A MEANS OF RENDERING THE ENEMY UTTERLY INCAPABLE OF CONTINUING TO PROSECUTE THE WAR.[186]

This theory of action borrowed a page from the strategic bombing paradigm to correctly assume that dispersal is one likely defense against strategic air attack.[187] Barnes Wallis' theory led him to ask, "what forms of power were *impossible* to disperse?" His answer was dams. His assumptions helped to build enough consensus to create the means necessary. Theory drove the creation of means to make a strategic way possible.

Pursuing Wallis' approach required more than a special bomb. It needed special Airmen to execute the elaborate mission. Those Airmen were a new kind of "air commando" molded in the spirit of the ground commandos who pulled off daring raids like Operation Chariot against the Biscay sub pens. On March 15, 1943, the British formed the special 617 Squadron to train for and execute Operation Chastise.[188] This mission relied on an unescorted, low-level ingress behind the dams to release Wallis' bouncing bombs at the correct range and azimuth.

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[186] Royal Air Force Museum, "617 Squadron and the Dams Raid" online exhibition, http://www.rafmuseum.org.uk/research/online-exhibitions/617-squadron-and-the-dams-raid/barnes-wallis-papers/read-a-transcript.aspx, (accessed 22 Nov 14, 0800), capitalization and underlining are original.
[187] Enemies followed this same basic pattern in Vietnam, Afghanistan, and Iraq. The same pattern appears to be forming in ISIL. See The Telegraph, "ISIL fighters disperse within Syrian and Iraqi cities to evade US air attacks", http://www.telegraph.co.uk/news/worldnews/middleeast/iraq/ 11112171/Isil-fighters-disperse-within-Syrian-and-Iraqi-cities-to-evade-US-air-attacks.html, accessed 22 Nov 14, 0900.
[188] Alan Cooper, *The Dam Buster Raid: A Reappraisal, 70 Years On* (Pen & Sword Aviation, South Yorkshire, England, 2013), 16.

To be successful, strategists must not only develop a sound hypothesis, but also must be scientists of bureaucracy to weave their ideas through large organizations. The Dambuster Raid was no different. The Commander of the RAF Bomber Command, Air Marshal Arthur "Bomber" Harris, plainly opposed the idea. He had the duty of allocating precious bombers across a global conflict. In a February 14, 1943 letter, Harris wrote, "This is tripe of the wildest description. There are so many 'ifs'… stop them from putting aside Lancasters [for this] wild goose chase."[189] He maintained his general opposition before and after the raids based on simple cost benefit analysis: he did not believe the potential pay-off was worth the crews, planes, money, or time. Harris was desperate for results. Pursuing morale bombing with all his available means provided more certain results. In his mind, he was best positioned to understand the overall limits in bomber production. He was consumed with the same dilemma that had to be addressed at the Casablanca Conference in January 1943: the mounting demands for airpower everywhere in a world war. Nevertheless, Bomber Harris reluctantly approved the mission four months later when Britain was desperate for any positive outcome in the conflict.

On May 16, 1943, the aviation commandos from the 617th executed the daring raid where they lost nearly 40% of the Airmen involved in the mission.[190] The first glance results were significant. Two of the three dams were breached: the Eder and Mohne with minor damage to the Sorpe. The floodwaters went as far as Holland and

[189] Cooper, *The Dam Buster Raid*, 16.
[190] Commonwealth War Graves Commission, 2005, Operation Chastise: The Dams Raid, 16/17 May 1943, p 4-5, accessed 17 Nov 2014, 2315. Fifty three of the 133 airmen killed included men from the Canadian and Australian Air Forces.

Belgium.[191] Approximately 1650 people drowned in the deluge.[192] Later, analysts determined that overall German steel production in the Ruhr Valley declined 8% in the second half of 1943.[193] Albert Speer stated, "We were in great danger, if the English had systematically destroyed all the dams in the region, our steel industry would have collapsed."[194] Steel production was an abiding issue inside Germany. Speer's central planning committee met 62 times during his rule over German industrial mobilization. Of these meetings, 30 were devoted to the problems of steel production allocations across the entire national effort including armaments. An additional 11 of the 62 meetings were about coal production that was proportional to the quantity of steel that could be optimized.[195] Based on Germany's level of attention devoted to steel and the coal-steel nexus, it appears the Dambusters had indeed touched on a bottleneck in the German industrial economy.[196]

Innovative ways like the Dambuster Raid often have second and third order effects. Albert Speer also noted that thousands of men stopped building the Atlantic Wall defenses along the English Channel to repair the dams. The impact of the dam repair on the D-Day invasion is incalculable, but losing 1000s of men on the Atlantic Wall project was at least unhelpful to the German cause. Finally, the positive boon to British morale flooded headlines across the world in proportion to the German embarrassment that the

[191] Cooper, *The Dam Buster Raid*, 109.
[192] Ralf Blank, "Die Nacht vom 16. auf den 17. Mai 1943 – 'Operation Züchtigung': Die Zerstörung der Möhne-Talsperre." *Landschaftsverband Westfalen-Lippe*, May 2006, accessed 20 Nov 2014, 2230. In the fog of war, several hundred of the dead were Allied POWs imprisoned in the Ruhr industrial valley.
[193] Blank, "Die Nacht vom 16. auf den 17. Mai 1943 – 'Operation Züchtigung': Die Zerstörung der Möhne-Talsperre," 200.
[194] Quoted in Cooper, *The Dam Buster Raid*, 116.
[195] Adam Tooze, *The Wages of Destruction: The Making and Breaking of the Nazi Economy* (London: Penguin, 2008), 567.
[196] Tooze, *The Wages of Destruction*, 597.

Luftwaffe had allowed the attack. Luftwaffe Chief Hermann Goering had said such raids would never happen.

The attacks also provided a foundation for the kinds of missions the 617th could now accomplish. The squadron's fame grew to the point where the King personally approved its motto "After Us the Flood."[197] This unit went on to drop the massive Tallboy (15,000lbs) and Grand Slam bombs (22,000lbs). The 617th also bombed aircraft factories, D-Day targets, V1/2 rocket sites, and sub pens (with heavier bombs that could actually destroy the pens).[198] Yet the Dam Buster Raid also spurred later legal misgivings. By 1977, the Geneva Conventions made attacking dams illegal "if such attack may cause the release of dangerous forces from the works or installations and consequent severe losses among the civilian population."[199]

The Dambuster Raid further demonstrated how strategy can develop in diverse parts of a large organization. Bomber Harris was the custodian of British bombing strategy and controlled the means to implement it. He opposed the idea of the Dambuster raid before *and* after it happened. The dam strategy started, developed, and succeeded on some level *despite* Harris' reservations. In many respects, it was a hybrid strategy that emphasized the destruction of both German capability and will, but at its core the Dambuster theory centered on attacking weakness in the industrial economy more like Industrial Web Theory.[200]

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[197] Paul Brickhill, *The Dam Busters* (Evans Brothers Ltd, London, 1951), p 84, 102.
[198] Alan W. Cooper, *Beyond The Dams to the Tripitz* (William Kimber, London, 1983).
[199] "Protocol Additional to the Geneva Conventions of 12 August 1949, and relating to the Protection of Victims of International Armed Conflicts (Protocol 1, 8 Jun 1977) [ICRC Treatise and Documents], accesses 17 Nov 2014, 2300. This US never signed this protocol.
[200] Craven and Cate, *Army Air Forces*, 2:351. The official history notes: "Just as the American analysts had their method shaped by their operational doctrine, so the British were influenced by theirs. British analysis were not, however, unaware of the virtues of attacks on… "bottle-neck" industries. A paper prepared by the Air Ministry in July 1939 called attention to the value of these restricted objectives. There were, it said,

Hypothesizing from Casablanca to the Oil Offensive

Developing theory does not end when war begins. This fact is especially true when strategists deal with new concepts that still require experience, experiment, and exercise, as was the case with strategic bombing in World War II. At Casablanca in January 1943, ground commanders turned to ground combat concepts that had developed since the dawn of human history. Meanwhile, air commanders and heads of state thought about the best ways to apply existing theory for a form of warfare that was merely 40 years old.

In the effort to design air strategy, all four levels of theory made key appearances in the early part of 1943. First, General Arnold directed the creation of the Committee of Operations Analysts (COA as it was later called) on December 9, 1942 to honor the multidisciplinary nature of the theory involved. Civilian experts in non-military fields were required since military officers did not have backgrounds on essential subjects needed to produce sound hypotheses. The COA included a lawyer with unusual experience in the field of finance and industrial management (Elihu Root), a Princeton historian of diplomatic and military affairs (Edward M. Earle), a student of German society and the author of the post World War I plans for Germany (Thomas Lamont), representatives from the Board of Economic Warfare (Fowler Hamilton), and

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"vital spots in industry as well as in the human body," but it warned that these would probably be well guarded by natural circumstances or by artifice. In addition "there are… many alternative manufacturing processes… particularly in countries which have made a deep study of their industrial economy and have organized their industry to meet modern war conditions." Area attack, on the other hand, "is not intended to imply an indiscriminate scattering of projectiles over the whole or any part of the country… On the contrary, there will be definite objectives in the area of … industrial targets [which]… constitute the chief vital spots of the industrial body."

representatives from the Office of Strategic Services (Edward S. Mason).[201] However, absent from the multi-disciplinary group were industrial engineers and business managers.[202]

At least two important concepts from general strategic theory were emphasized by this group: a principle of war (concentration) and cumulative versus sequential strategy. The board stated, "It is better to cause a high degree of destruction in a few really essential industries or services than to cause a small degree of destruction in many industries. Results are cumulative and the plan once adopted should be adhered to with relentless determination."[203] Ironically, both of these general principles would be reversed in the Warden Era where theory drove targeting to span several categories all at once to achieve a temporary paralysis of a country. For World War II air strategists, the key to success was determining which components of the industrial web contributed the most to an enemy's war effort, and pounding them.

Theories of action were at work too. Resource constraints fueled debates at the Casablanca Conference. The Allies spread aircraft literally all over the world. Collectively, resource scarcity affected the manner in which the Allies fought; they had to adapt to the reality of the war's character that they confronted.

The Casablanca decisions ultimately included *bot*h U.S. and U.K. theories of action. Following the conference, Eighth Air Force would get its first "undistracted" crack at implementing the Industrial Web Theory once the bombing of Germany proper began at the end of January 1943. The culmination of these initial efforts were the

[201] Craven and Cate, *Army Air Forces*, 2:353.
[202] Craven and Cate, *Army Air Forces*, 2:354.
[203] Craven and Cate, *Army Air Forces*, 2:355.

attacks on Schweinfurt's ball-bearing plants in August and October that year. Three key assumptions drove the selection of the bearings as a vital target in Germany's industrial web.[204]

1. Ball-bearings were pivotal in the German economy—damage to bearing producers would soon be shared by their consumers—in particular, the German military.
2. The concentration of ball-bearing plants was especially high.
3. The recovery of these plants would be difficult if not impossible.

This hypothesis regarding the importance of the bearings proved to be wrong for the following reasons:[205]

1. The machine tools inside the bearing factories were not susceptible to blast damage, which led to easy recuperation.
2. Stocks of raw materials and semi-finished bearings were not harmed irrevocably.
3. Hits on vital processes of the plants were not enough to put the plant out of commission, as processes were well compartmentalized which led to a "matrixed" approach to production and the ability to create a finished product.
4. Bearing machinery was versatile and could be reconfigured for use in other processes.
5. The Germans aggressively redesigned their armaments to minimize the need for ball-bearings.
6. Stocks of finished bearings were tightly controlled to ensure availability for essential machinery.
7. Aware of the vulnerability, Germany appointed a czar with full authority to manage the entire life-cycle for bearing production.
8. As a result, energetic countermeasures were in place like dispersal of stockpiles away from large plants, bomb proofing blast walls within bearing factories, construction of underground plants, and rapid repair of damaged machinery.
9. Smaller plants left off the main target list ramped up production to compensate for the down turn in cities like Schweinfurt.
10. The German's purchased an enormous amount of ball-bearings from neutral Sweden, thus, Germany was not a "closed system."

The Germans were ready for this form of strategic bombing. Using careful defense and management, they out-smarted the American effort to destroy a perceived "vital center" of Germany's industrial web. The Americans "could not envision how the momentum

[204] USSBS, "The German Anti-Friction Bearings Industry," (7 Nov 1945), 4.
[205] USSBS, "The German Anti-Friction Bearings Industry," (7 Nov 1945), 1-4, 62.

generated by a war against an equally committed foe would transform their progressive notions about bombing."[206] Targets in Germany's industrial web continued to guide American attacks, but the emphasis on precision began to slowly slip away.

The results of the two Schweinfurt raids, which together cost Eight Air Force 120 B-17s and their crews, simultaneously questioned the tactic of high-altitude precision daylight bombing (HAPDB) and the theory of action that endorsed this approach. American air leaders assumed that massed bombers could fight their way deep into enemy territory—unescorted--with acceptable losses. But more Airmen were lost in 8AF than all Marines in the Pacific theater of war.[207] The assumption that the bomber would always get through was painfully wrong.

At the same time, the Schweinfurt raids called the Industrial Web Theory itself into question. The Committee of Operations Analysts made two mistakes in their diagnosis: one by omission and one by commission. They omitted the German electric grid as an Industrial Web target that was later revealed to be Germany's greatest fear.[208] They also placed ball-bearings above oil as a priority. This decision tacitly overruled the analysis of the ACTS instructors who had created AWPD-1, the Army Air Forces August 1941 plan for war with Germany and Japan (see table 5). Like in medicine, a good diagnosis in strategy can be elusive. Perhaps the lesson is less about the failure of theory and more about the difficulty of making sound assumptions based on that theory given the context encountered. The members of the Committee of Operations Analysts did not realize the actions that the Germans had taken and could take to thwart an assault on ball-

[206] Clodfelter, *Beneficial Bombing*, 112.
[207] Clodfelter, *Beneficial Bombing*, 182.
[208] Craven and Cate, *Army Air Forces*, 2:362. This conclusion is affirmed by Albert Speer and the USSBS Overall Report.

bearings. Yet other targets in Germany's industrial web were more vulnerable—in particular, oil.

American Airmen consistently stressed attacking oil in their planning documents to cripple the German economy. AWPD-1, AWPD-42 (the follow-on plan to AWPD-1, developed in August 1942), and the Combined Bomber Offensive Directive that emerged from Casablanca all designated oil as a key bottle-neck target.[209] Table 5 captures the evolution of oil as a priority over time. After 1944, oil and transportation were the top 2 priority objectives

Table 5: Industrial Web-Type Target Priorities (Source: Craven and Cate, *Army Air Forces,* 2:356-362, 368, 369.

AWPD-1 Priorities	**AWPD-42 Priorities**	**CBO Directive**	**COA Report**
Electric power[210]	The German Air Force	Submarine construction yards	German aircraft industry
Transportation	Submarine building yards	The aircraft industry	Ball-bearings
Oil and Petroleum	Transportation system	Transportation	**Oil**
German morale	Electric power	**Oil**	Grinding wheels and crude abrasives
	Oil		Nonferrous metals
	Aluminum		Synthetic rubber
	Rubber		Submarines
			Military motor transport vehicles
			Transportation system

[209] Clodfelter, *Beneficial Bombing*, 163.
[210] The German Air Force was an "intermediate objective" that had to be wrecked first before "the accomplishment of the principal objectives." See Clodfelter, *Beneficial Bombing*, 95.

Arnold believed that an oil offensive would provide that breakthrough for which the US Airmen had long hypothesized. He was partially right. From May 12, 1944 to V-E Day (May 8, 1945), the 87 oil-producing targets received 191, 256 tons of American and British bombs. Unlike the Ploesti raid in August 1943, the 1944 oil offensive represented a sustained campaign against this industrial web target. From the summer of 1944 to March 1945 aviation gasoline production dropped 98% (by D-Day production had already decreased by 58%).[211]

Numerous second order effects resulted from declining oil production. The skill of German pilots plummeted as they entered combat with only 40-45 hours of training under their belts due in part to lack of fuel for flying. Aircraft gas also was not readily available to counter the D-Day invasion. The scarcity of vehicle gas led to austerity measures like moving tanks to France with oxen and new rules limiting the range and speeds of tanks. The fuel that did exist was of significantly lower quality so machines performed below specifications.[212]

The attacks on oil also produced key third order effects on Germany. War industry products that depended on petroleum declined in unpredictable ways like rubber (65%), nitrogen (63%), and methanol (40%). Such chemicals were essential in the production of explosives. Explosives production tied to petroleum declined 50%. The decline in nitrogen even affected fertilizer production. For this and other reasons, crop harvests declined approximately 22%. Finally, the Germans diverted a 350,000-person emergency reconstruction effort to repair the oil targets—a manpower diversion with

[211] *USSBS*, "Oil Division Final Report," 1-3, 74, 82, 87.
[212] *USSBS*, "Oil Division Final Report," 1-3, 74, 82, 87.

unknown third order effects during a critical period of the war.[213] The impact of the oil offensive was compounded by the transportation offensive which cut the transportation of coal upon which most industries operated.[214] Suddenly, Germany became an image of a faltering war machine.[215]

While the oil offensive was a successful application of Industrial Web Theory, this success was *cumulative* when combined within the broader macro-economic context. The United States entry into the war signaled to Germany much more than a more difficult war. German leaders feared—very early on—if the U.S. fully mobilized for war, Germany could be out produced, or out-massed at a macro industrial level. As Adam Tooze noted in *The Wages of Destruction*,

> By any reasonable estimation, Hitler's declaration of war on the United States sealed the fate of Germany. The economic and military forces arrayed against the Third Reich by early 1942 were overwhelming. As we have shown, this fatalistic view was shared by all those most closely involved with the management of the German war effort up to the Moscow crisis. Udet of the Luftwaffe, Fromm of the army, Thomas of the Wehrmacht high command, Todt in the Armaments Ministry, Canaris in intelligence, Rohland and his colleagues in the Ruhr, all came to the same conclusion. All these men had thrown in their lot with Hitler's regime. But they were not ignorant of the basic trends of early twentieth-century history. They were as convinced as the vast majority of their contemporaries of the pivotal importance of the United States economy. None of them doubted that once American industrial capacity was mobilized—and they were fully aware of the measures that had already been taken in 1940 and 1941—Germany's situation would be worse than that of 1918.[216]

Long after the war, Alfred Mierzejewski dug up new data inside Germany which indicated transportation targets were the most lucrative strategic bombing target.[217]

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[213] *USSBS*, "Oil Division Final Report," 1-3, 74, 82, 87.
[214] Clodfelter, *Beneficial Bombing*, 181.
[215] The oil offensive was judged a success by four critical sources: the USSBS (which was critical of other operations like the ball-bearing raids), the Galbraith Report, Albert Speer, and author Richard Overy. Tami Biddle conceded that German oil production was strangled.
[216] Tooze, *The Wages of Destruction*, 668-669.
[217] Alfred Mierzejewski, *The Collapse of the German War Economy, 1944–1945* (Chapel Hill: University of North Carolina Press, 1987).

Combined with the findings of oil and steel bombing, this supports the notion of strategic bombing as a cumulative effects strategy where some target sets mean more than others but no one may be decisive.

While the oil offensive illustrates how the Upstream Model worked at one level, this example also illustrates there are other levels of strategy at play and therefore, other levels of analysis that will be addressed in Chapter 5. On one hand, that the oil offensive shows how Industrial Web at its high point in World War II was still a cumulative strategy rather than an example of successful panacea or bottleneck targeting. On the other, it shows there was merit to the Industrial Web theory because not all industrial target categories exacted equal concern upon the Germans. Some targets were simply more important than others and theory made Airmen search for those causal strands.

Obliteration Bombing: Hamburg

On July 28, 1943, the implementation of the Morale-Effect Theory reached a dubious height and in the process created a new word: firestorm. The British launched Operation Gomorrah on the German industrial city of Hamburg. On this night, 2,326 tons of munitions descended on the city in 43 minutes of nighttime area bombing--consistent with the British theory of action aimed at "de-housing" factory workers. Winds fanned over dry building material into an eight-square block firestorm that killed 42,000 civilians.[218]

Operation Gomorah displayed an important "how we fight" shift in the character of the war for Britain. The British moved toward an "annihilation" strategy over time.

[218] History Channel online, "Hamburg Suffers a Firestorm", http://www.history.com/this-day-in-history/hamburg-suffers-a-firestorm, accessed 22 Nov 14, 2300.

Two factors spurred the transformation. First, events like Dunkirk and the Blitz of London drove the British sense of what was "proportional" in a conflict where the enemy appeared to have no moral scruples. Second, the British suffered from severe technical limitations. They had attempted a daylight bombing campaign against German industry in 1941 and sustained grievous losses in the effort. Thus, under Air Marshall Harris, they switched to night area bombing in February 1942, but the transition negated the possibility of accurate attacks.

As early as 1940, British air leaders could foresee what might be necessary to defeat Germany from the air but they weren't "there" yet. Air Chief Marshal Charles Portal wrote:

> We have not yet reached the stage of desiring to burn down a whole town, but when this stage is reached we shall do it by dropping a large quantity of incendiaries first and then a sustained attack with High Explosive to drive the fire-fighters underground and let the flames get a good hold…[219]

Such ways of employing the bomber force would have to match the political goals desired, and they did so as the war progressed. At the Casablanca Conference, Roosevelt and Churchill agreed that the political objective of World War II would be the "unconditional surrender" of the Axis powers. Yet long before this statement, both the British and the Americans had pursued that goal.[220] RAF Bomber Command had attacked Cologne on 30 May 1942 and burned much of that vast city to the ground in a "thousand plane raid." The destruction at Hamburg was greater, but the intent was the same—weather conditions helped create an anomaly that killed so many people. The

[219] Dennis Richards, *Portal of Hungerford* (London: William Heinemann Ltd, 1977), 165. Endnote found in Overy, 226.
[220] See Gerhard Weinberg, *A World at Arms* (Cambridge: Cambridge University Press, 1994), 438-439.

objective of unconditional surrender simply justified the ways (area bombing) and means (bombers with high explosive and incendiary bombs) used. The British had visited Hamburg 137 times before,[221] but never quite like this raid.

The name Operation Gomorrah captured the theory: the annihilation of people, will, and industry—everything of value—to induce collapse. By the summer of 1943, the British had refined this method:

> The techniques of area bombing were now pretty well perfected. Diversionary raids confused and scattered the defenders, the Pathfinder force marked the target, the bombing stream of Halifaxes and Lancasters… struck in intervals. Scientific analysis had achieved the appropriate combination of bombs to drop, in the right sequences: high explosives to create debris, incendiaries to set it afire, more high explosives to deter the fire fighters, more incendiaries to spread the blaze, some phosphorus to add more horror, and some delayed-action bombs to disrupt rescue and recovery efforts.[222]

The British also introduced chaff on this raid—bundles of thinly cut aluminum foil to deceive radars (then called "Widow"). Chaff blinded the nighttime German command and control with false targets on their radars. The pounding of Hamburg lasted for eight days and seven nights. It blended British Morale-Effect Theory by night, and American Industrial Web Theory by day, and thus conformed to the "around the clock" bombing that Churchill had found so appealing at Casablanca. On night one, 740 British bombers dropped 2,396 tons on Hamburg with only 12 bombers lost in combat.[223] The next day, two waves of American bombers totaling 323 B-17s attacked industrial web targets: submarine construction yards and associated installations.[224] Then, on night two, the science of British fire bombing married with low humidity and windy conditions to create

[221] James L. Stokesberry, *A Short History of Airpower* (New York; William Morrow and Co, 1986), 222.
[222] Stokesberry, *A Short History of Airpower*, 222.
[223] Janusz Piekalkiewicz, 1978, *The Air War* (Blandford Press, Harrisburg, PA), 433.
[224] Craven and Cate, *Army Air Forces* 2:677.

a firestorm. “Everything moveable was being sucked toward the vortex, exactly like a tornado of flame.”[225] The pounding continued for six more days and nights.

On day five, the Reich Minister of Propaganda Dr. Joseph Goebbels wrote in his diary: “Kaufmann is giving me a preliminary report on the effects of the British raid [in Hamburg]. He speaks of a catastrophe of hitherto inconceivable proportions. We are seeing the destruction of a city of millions of people, an event unparalleled in history. The resultant problems are virtually insuperable.”[226] One could argue that Hamburg reflected the willingness of the Allies to pursue a strategy of annihilation. For the British, the Morale-Effect Theory and area bombing approach behind Hamburg were proportional to the ends of unconditional surrender. The strategy chosen for Hamburg would reappear over Berlin, Munich, Nuremberg, and ultimately Dresden. American Airmen would also find the theory of action appealing after the failure of the Industrial Web Theory over the skies of Japan.

The Shift to Morale Effect Theory in the Firebombing of Japan

World War II was a total war for its major belligerents.[227] But even unlimited wars have stages of “totality” that affect how a war is fought. The firebombing of Japan represented a new level of death and destruction in World War II. The first five of 66 fire raids alone “incinerated nearly thirty-two square miles of urban real estate—which

[225] Stokesberry, *A Short History of Airpower*, 223.
[226] Janusz Piekalkiewicz, *The Air War* (Harrisburg, PA: Blandford Press, 1978), 267.
[227] That said, its character was more total for some states than others. The Germans and Soviets committed more of their societies to the war effort than did the Americans.

equated to 41 percent of the destruction inflicted on German cities by the Army Air Forces *during the entire war*."[228]

Again, theory was present in the logic of firebombing but its influence varied from one snapshot in time to the next. In the case of Japanese firebombing, no less than 14 different factors led U.S. Airmen to embrace the morale effect theory to justify the firebombing of Japan.

1. There was no time to wait for "bottleneck" targets to bear fruit at a later—unknowable—date since a pitched battle for Iwo Jima was taking place.
2. President Roosevelt assumed the Pacific War would be long and protracted so he urged for a shortcut to attack "the heart of Japan."[229]
3. Collectively, there was mounting pressure for a swift end to the war to avoid Operation Olympic—a bloody D-Day-styled invasion of Japan.
4. The desire for a quick end of the war merged with the paradigm assumption that strategic bombing shortens wars to justify re-framing the strategy more in line with the morale-effect school of thought.[230]
5. Japanese households supported the production of war materiel through a network of cottage industries integrated into the war effort which justified bombing households in general.
6. Technical limitations—the inability to bomb accurately from high altitude through the winds of the jet stream—made executing industrial web theory very difficult.
7. Weather limitations—in the form of poor bombing weather—added to aircraft technological limitations to make industrial web applications consistently unattainable.
8. The Navy received very positive press in the US for successful carrier-based missions on strikes in downtown Tokyo in February 1945 which in-turn pressured airmen to prove their worth somehow.
9. General Arnold, spurred by 20th Air Force Chief of Staff Brigadier General Lauris Norstad, fired Haywood Hansell over lack of industrial web results and Hansell's reluctance to follow direction to implement area bombing over Nagoya.
10. Arnold pressured LeMay, via Norstad, to get quicker results.
11. Striking Japan had deeper retribution psychology for Americans (analogous to British psychology toward Germany) which was fueled by fresh news of Japanese atrocities like the Bataan Death March (in 1942) and lingering thoughts of Pearl Harbor.

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[228] Clodfelter, *Beneficial Bombing*, 222.
[229] Michael S. Sherry, *The Rise of American Airpower: The Creation of Armageddon* (New Haven: Yale University Press, 1987), 160. Quoted in Biddle, *Rhetoric and Reality*, 262-263.
[230] Clodfelter, *Beneficial Bombing*, 197-198. See Arnold's logic provided to Roosevelt.

12. General LeMay staked his reputation on claiming Japan would surrender through air bombardment before an invasion was necessary.[231]
13. President Roosevelt consoled himself by thinking long term; if drastic means were necessary to bring a quicker end to the war, such methods would at least increase the long-term deterrence effect against other nations thinking about aggression.
14. Japanese kamikaze (suicide) operations increased the perception of Japanese treachery and therefore, what U.S actions would be proportional in response.[232]

As discussed previously in figure 2, many influences crowd the selection of ways in strategy. Yet, even through this complex list of factors, the levels of theory can be found exerting their influence on the ways chosen to employ airpower—area bombing—to help achieve the political goal of unconditional Japanese surrender.

In terms of general strategic theory, President Roosevelt determined after Pearl Harbor that the war with Japan would be a *protracted conflict*. This assumption matched the character of the enemy—an ethnically homogenous and nationalistic people with imperialist ideas, an ancient warrior ethos in the Bushido Code, and a strong cultural bias for saving face. As Barrett Tillman noted, "Why Tokyo persisted with a losing war for so long remains an enduring question… neither regime in Tokyo or Berlin ended the war out of concern for massive civilian suffering until excruciating pain and unprecedented destruction had been inflicted."[233] Thus, following the tenets of the Morale Effect Theory was a gamble for American airmen, but air leaders also knew that industrial web logic could not ensure success as they raced against the clock.

Barrett Tillman further cited statements from Japan's military and civilian leaders to express the intensity of Japan's national will. Vice Admiral Takejiro Onishi assumed

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[231] Clodfelter, *Beneficial Bombing*, 228. Further, Arnold desperately wanted bombing to achieve independent success and obviate the need for an invasion—thus laying the ground work for a separate Air Force after the war. See Clodfelter, *Beneficial Bombing*, 197, 211, 214.
[232] Clodfelter, *Beneficial Bombing*, 217-229. This list is paraphrased but derived from the content in pages 210-229.
[233] Barrett Tillman, *Whirlwind: The Air War Against Japan 1942-1945* (New York: Simon & Schuster, 2010), 256.

that the U.S. would invade the Japanese mainland. Onishi characterized how death was more honorable than defeat in Japanese culture. Tillman wrote of Onishi's comments, "The expected Allied invasion would be repelled with 'acceptable' Japanese casualties of 3 to 5 million, though he allowed that eventually 20 million might perish. Nevertheless, with sufficient 'Japanese-ness of spirit' the struggle might be maintained for years or even decades."[234] According to the Rubicon Theory of war, once leaders have mentally committed to war, they shift to an implemental mindset of no-turning-back even if logic suggests they should.[235] Roosevelt's assumption about a protracted war appeared very sound, but it also compelled American political and military leaders to determine how many Americans they were willing to lose in achieving unconditional surrender—and how many Japanese they were willing to kill.

To help resolve that dilemma, multi-disciplinary theory in the form of ethics provided insights. The ethics of area bombing revealed that there are no short-cuts in a morale universe. Roosevelt's desire for a quicker end to the war and the desires from leading airmen like Arnold and LeMay to have bombing score a war-ending knock-out blow before an invasion could begin brought America full-circle to the multi-disciplinary questions in the just war tradition. The Americans, like the British before them in the European theater, were in a constant dance—knowingly or unknowingly—with just war theory. The formal theory had developed in religion and philosophy, not the military.[236]

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[234] Tillman, *Whirlwind*, 257.
[235] Dominic D. P. Johnson and Dominic Tierney, "The Rubicon Theory of War," *International Security* 36 (Summer 2011), 7-10.
[236] *New Dictionary of the History of Ideas*, "War" (Detroit: Thompson Gale, 2005), 6:2450-2454. Augustine of Hippo (354-430 C.E.) formally grappled with a standard for justice in war. Thomas Aquinas (1225-1274) established three of six principles used today: just cause, right intent, and competent authority. Francisco de Vitoria (1486?-1546) and Francisco Suarez (1548-1617) are credited with adding the other three criteria: probability of success, proportionality, and last resort. Combined, these six principles became recognized rules of *jus ad bellum* in the West for grading if a war is justifiable. What airpower

Nor did the classic contemporary work on the subject, *Just and Unjust Wars* (1977) by Michael Walzer, originate from a military author.

Martial traditions were rich with ethics, but such ethics are not constant. What was deemed proportional in a war for limited stakes differed significantly from one that threatened national survival. Nevertheless, the "standards" that accompanied the latter type of conflict were amorphous. For Arnold, Norstad, Hansell, and LeMay, the prospect of incendiary bombing that targeted civilians forced the air leaders to confront their respective consciences and the reputation of the AAF.[237] Arnold's initial written direction to LeMay to start fire bombing was cryptic; Norstad[238] referred to vague special purposes for doing so; Hansell was fired for his reluctance to comply with fire-bombing; LeMay justified increased brutality to bring the war to a quicker end; and they all told themselves that they still operated according to the notions of the Industrial Web theory.[239] To students of the Peloponnesian War, this question of conscience about targeting civilians was reminiscent of Athenian messengers who rowed slowly to Mytilene to carry out the unjust death sentence against that populace.[240] Conscience is a variable in international affairs.

The blending of Industrial Web notions with those of Moral Effect Theory within the paradigm level of theory (i.e. strategic bombing) stemmed in part from the amount of

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strategists faced throughout World War II were the related principles of justice in how war was fought or, *jus in bello*. Through the Hague and Geneva Conventions on this subject, there are three principles of justice in war: non-combatant immunity, proportionality, and just war norms summarized in the "laws of armed conflict" (the later is now a mandatory annual training requirement in the modern Air Force).

[237] Clodfelter, *Beneficial Bombing,* 222.

[238] Norstad acted in Arnold's stead when the 20th Air Force commander collapsed with his fourth heart attack of the war in January 1945. Later Norstad and Arnold were both much more specific in directing fire raids.

[239] Clodfelter, *Beneficial Bombing*, 216, 210, 211, 221, 223.

[240] Thucydides, Robert B. Strassler, and Richard Crawley, eds., *The Landmark Thucydides: A Comprehensive Guide to the Peloponnesian War* (New York: Free Press, 1996), 3.49.4.

trial and error Industrial Web Theory required to achieve success. Air leaders believed that precision bombing of industrial bottlenecks would lead to a shorter war, and area bombing offered the way to destroy many of those dispersed targets in one fell swoop. The paradigm of strategic bombing endured, but the situation encountered—and the overriding emphasis on fast results—demanded a mixture of both theories of action stemming from that paradigm. LeMay and his predecessor, "Possum" Hansell, both struggled with an assumption of Industrial Web Theory: sufficient knowledge of that web. Unfortunately, both commanders suffered from a "dismal lack of specific knowledge concerning the industrial fabric of Japan."[241] This was another aspect leading U.S. logic toward Morale-Effect Theory.

To enhance the implementation of the Morale-Effect Theory, the Americans dropped thousands of leaflets before the area attacks warning of the destruction to come. These psychological operations encouraged surrender and attempted to break Japanese will to continue the war. "The ability to announce future attacks and then conduct them made a powerful impression on the Japanese, and actually contributed to achieving the prewar progressive aim to avoid civilian casualties—many people who read the notices survived LeMay's onslaught by evacuating the cities listed."[242] In a strange twist of fate, the nation that held so passionately to the Industrial Web Theory of action was now pursuing Morale Effect Theory as the United States drafted "Father Time."

Operation Olympic vs. Hiroshima and Nagasaki

[241] Frank, Richard B. *Downfall: The End of the Imperial Japanese Empire*. (New York: Random House Incorporated, 1999), 335.
[242] Clodfelter, *Beneficial Bombing*, 228.

By 1945, Imperial Japan had taken its people to the edge of cataclysm. The strategic factors of defeat were numerous. The naval blockade so central to the War Plan Orange against Japan,[243] cumulatively had the nation on the edge of starvation.[244] Japan was on the verge of loosing 10,000,000 to mass starvation when it officially surrendered on September 2, V-J Day. This starvation would have amplified had the Allies begun strategic bombing of Japan's rail system and food distribution—already heavily rationed—which could not be distributed throughout the country. The U.S. Strategic Bombing Survey on Japan's rail system described the Japanese railway system as "one of the most vulnerable of any size to be found any- where" and, "In view of the disrupted condition of coast-wise shipping and the shortage of trucks, the railways are the back-bone of the entire transportation system." [245]

Two invasions loomed. Stalin agreed that the Soviet Union would enter the war against Japan once Nazi Germany was defeated. Stalin kept his word. He declared war on Japan and the Soviet invasion of Manchuria began on August 8, 1945, exactly three months after V-Day in Europe. There was no deliberate planning with the U.S. to coincide with the atomic bombings.[246] Historian Richard B. Franks concludes the Russian declaration of war was a strategic factor in victory but not the decisive one. [247]

The other planned invasion was the U.S. led Operation Olympic against the Japanese mainland. Right up to the bomb on Hiroshima, Marshall believed this invasion would be necessary to secure unconditional surrender even though an American invasion

[243] Edward S. Miller, War Plan Orange: The U.S. Strategy to Defeat Japan, 1897-1945 (Annapolis: Naval Institute Press, 1991), 36.
[244] Frank, *Downfall*, 351.
[245] Frank, *Downfall*, 352.
[246] David M.Glantz, *August Storm: The Soviet 1945 Strategic Offensive in Manchuria*, Leavenworth Paper No.7, Command and General Staff College (Fort Leavenworth, Kansas,1983), 1-4.
[247] Frank, Downfall, 348.

of Japan had be viewed with low probably of success going back to the beginning of War Plan Orange. The record shows that Marshall was probably right until the second bomb fell on Nagasaki. Contrary to contemporary assumption, Hirohito and his "Big Six" were committed to continuing the war even after the first bomb on Hiroshima. In post war testimony, Toyoda--leader of the Big Six war council in Japan—stated they had a "bullish" attitude toward continuing the war up to the morning of August 9 until they received word of the second atomic bombing of Japan over Nagasaki. Both bombs played a more critical role in Japanese calculus to surrender than all other strategic factors because these bombs "undermined the fundamental premise that the United States would have to invade Japan to secure a decision."[248] Since the atomic bombs were this critical, it is important to understand how theory shaped the selection of this way.

How to end the Pacific War confronted American leaders with more hard choices. First, by the summer of 1945, with its navy wrecked, its armies isolated, and most of its cities burned, Japan was in a desperate condition. The Allies could declare victory and stop fighting, but that action would be incompatible with the objective of unconditional surrender. Second, the US could continue the siege of Japan by naval blockade, but the widespread shortage of basics would likely have produced more civilian deaths than the atomic bomb. Third, the Americans could have launched the proposed D-Day style invasion of Japan called Operation Olympic. America was still burying its dead from the war in Europe and coming to grips with the loses suffered there. Another D-Day against the fanatical Japanese would cause untold casualties. Finally, the atomic bomb offered a fourth option for ending the war by opening an unknown door into the nuclear age.[249]

[248] Frank, *Downfall*, 348.
[249] Tillman, *Whirlwind*, 265-269.

Yet there was no guarantee that the bomb would work, or if it did, whether it would induce Japan's surrender.

American leaders viewed the atomic bomb as the logical outcome of blending industrial web and morale-effect theories of action that had spurred the fire raids. Their hypothesis was that the massive destruction caused by one aircraft and one bomb would shock Japan's leaders to such an extent that they would surrender quickly thereafter. After the savage firebombing, President Harry Truman and his airmen saw the atomic bomb as a proportional upgrade in bombing intensity as the nation "crossed the Rubicon" into a new kind of total war as the impact of the atomic bombs were wholly different from firebombing. The differences of a nuclear experience were captured profoundly by John Hershey.

Written in 1946, *Hiroshima* describes the profound horrors of the atomic attack that killed approximately 115,000 Japanese, many of whom perished in the slow, lurid, excruciating pain of radiation incineration and poisoning.

> [One survivor] met hundreds and hundreds who were fleeing, and every one of them seemed to be hurt in some way. The eyebrows of some were burned off and skin hung from their faces and hands. Others, because of pain, held their arms up as if carrying something in both hands. Some were vomiting as they walked. Many were naked or in shreds of clothing. On some undressed bodies, the burns had made patterns of undershirt straps and suspenders and, on the skin of some women… the shapes of flowers [from their] kimonos. [By nightfall], a great number of people sat and lay on the pavement, vomited, waited for death, and died.[250]

[250] John Hersey, *Hiroshima* (New York: Vintage Books, 1989), 29, 34-35. The entire contents of this book originally appeared in *The New Yorker* in 1946.

The use of atomic weapons not only led the war to a new level of totality, it also ushered in the nuclear age and changed the character of war itself as the use of nuclear weapons still loom around nations.

To this day, critics use Hiroshima and Nagasaki to question America's national temperament (while they often give firebombing a "pass"). Fifty years after the atomic attacks, the mayors of Hiroshima and Nagasaki compared those raids to the genocide of Hitler's holocaust.[251] Osama Bin Laden used the attacks to demonstrate America's willingness to kill women and children with weapons of mass destruction.[252] Writer Barrett Tillman noted: "Paul Tibbets [the pilot of the aircraft that bombed Hiroshima] was excoriated by leftists and pacifists for destroying Hiroshima. Harry Truman was second-guessed by two generations of historians…"[253]

The President and his airmen explored multidisciplinary concepts at the crossroads of just war theory, a strategy that called for rapid victory, a political end-state that demanded the eradication of a fanatical philosophy, and a new weapon that was truly fearsome. With the situation that they faced, they chose the option that they believed most likely to achieve the desired results. The strategic bombing paradigm and its two theories of action played a key role in the decision-making process, but the U.S. decision was one that neither political nor military leaders could have envisioned when the war began. The changing character of war swirled. Therein, Americans selected the atomic bomb according to premises of Morale Effect theory and through it potentially changed

[251] Tillman, *Whirlwind*, 265-269.
[252] "Usama bin Ladin: 'American Soldiers Are Paper Tigers,'" The Middle East Quarterly (December 1998), http://www.meforum.org/435/usama-bin-ladin-american-soldiers-are-paper-tigers (accessed February 20, 2015).
[253] Tillman, *Whirlwind*, 270.

warfare forever. The bomb worked. Total Japanese cataclysm was averted. Japan survived and rebuilt.

Comparative Analysis

In summary, the five levels of theory played key roles in the design of airpower strategy highlighted in the six examples from World War II. Theory has deliberate (pre war) and emergent stages (in the war) but throughout the combination of levels displays the same basic structure. To borrow from Graham Allison and Philip Zelikow's work on decision theory, the levels of theory organize details into "a limited number of causal strands that were woven into the most important 'reasons' of what happened."[254] Those reasons based on theory—more accurately known as assumptions—consistently provided the logic behind the ways selected to implement a strategy that evolved as the conflict progressed.

As the next case studies will reveal, assumptions exert a special influence on the strategy that ultimately emerges from the various levels of theory. When a hypothesis developed from theory proves faulty, a new hypothesis must guide strategy development as was the case with the blending of Industrial Web and Morale-Effect Theories that led to a new way of bombing Japan.

Even against Germany, the Industrial Web Theory had several flaws. For instance, it:

1. Failed to acknowledge Clausewitzian "iterations" caused by competing wills in battle, i.e., the enemy gets a vote—and will take measures to improve the integrity of their web.

[254] Graham Allison and Philip Zelikow, *Essence of Decision: Explaining the Cuban Missile Crisis* (New York: Longman, 1999), 379.

2. Overemphasized the positive outcomes of air warfare with the high-altitude precision daylight bombing, and dismissed such potential problems as weather, combat stress, and technological deficiencies.
3. Underemphasized the defensive strategies and technologies of the enemy—the assumption that unescorted bombers could destroy targets with acceptable losses was dead wrong.
4. Overstressed the psychological impact on collective enemy will caused by physical destruction in cities.
5. Grossly exaggerated the frailty of popular morale in general.
6. Wrongly used metaphors to imply that modern industrial systems were "closed" or brittle.
7. Ran the risk of "mirror imaging" and assumptions made in the German industrial establishment did not always coincide with American approaches. For example, not until after Stalingrad in 1943 did most German factories go into production for 24 hours a day.

Despite these failures of theory, Tami Biddle notes the following successes of the strategic bombing paradigm in World War II.[255] Strategic bombing:

1. Placed a heavy defensive burden on the Germans which contained the development of their overall war machine.
2. Undermined the German war economy in general by forcing dispersion of industry and limiting the means of the dispersion.
3. Strangled the German fuel supply (a priority set forth from the beginning by the ACTS authors of AWPD-1 but not given priority until the oil offensive of 1944).
4. Crippled the Wehrmacht's ability to supply itself.
5. Hampered the Wehrmacht's maneuvers on the battlefield.
6. Created a flexible arm to exploit real time opportunities created by the other services.
7. Contained the development of new weapons in Germany like the atomic bomb.
8. Aided at crucial junctures in the war at sea.
9. Made possible the Allied landing on D-Day.
10. Contributed to the collapse of Japan in August of 1945.
11. Demonstrated that a military force able to win and hold air dominance would have a profound advantage over its enemies in years to come.

American air leaders doubtless appreciated this record and would have highlighted one aspect of it in particular. To them, the firebombing of Japan in concert with the atomic attacks produced an independent victory that justified service autonomy.

[255] Biddle, *Rhetoric and Reality*, 286-287.

AAF Major General Frederick Anderson, who had served as the Commander of 8th Bomber Command, typified the air leaders mindset by writing Spaatz, who commanded the B-29 force in the Pacific at the end of the War. "I wish to congratulate you upon proving to the world that a nation can be defeated by air power alone."[256] Anderson, who directed the "Bombardment" instructions at the Air Corps Tactical School in (1940), might have added that World War II bombing validated ACTS theory. While that assertion would be questionable, what is not uncertain is that theory—at all four levels—significantly affected the ways used to employ the bomber during the conflict.

[256] Clodfelter, *Beneficial Bombing,* 312, note 164.

CHAPTER 3
TRANSFORMING THEORY TO STRATEGY IN GULF WAR I

The role of theory in creating World War II air strategy is naturally told in chronological fashion. Those strategies took decades to evolve and many intellects spanning the globe contributed to them. On the other hand, the Desert Storm and Allied Force cases present theory in a much shorter period of time. Thus, the intellectual history underpinning these cases can be told more thematically. Also, Desert Storm and Allied Force had very different contexts so each has its own chapter.

At the general strategy level, the joint services combined the logic of their approaches in large-scale conventional war against an invading force in the Middle East (or Southwest Asia as it was called). In the Pentagon, strategists had some time to think about the approach unlike, say, 9/11. Very diverse applications from general theory served as the logical foundations for what would follow. Multi-disciplinary considerations were numerous but one in particular—power vacuum theory—would make the 1991 war singularly different from that of Iraqi Freedom in 2003.

Twenty-five years of debate allows for a retrospective on the Desert Storm paradigm. This paradigm shift did not happen through intense incubators of theorizing like the Air Corps Tactical School but rather, right in the middle of war planning. This narrative reminds strategy students to think big when the situation requires—even if that means departing slightly from the lore of your fathers. The paradigm shift allowed leaders to see a compelling theory of action that Saddam Hussein found more disorienting than the “Shock and Awe” campaign in 2003.

Operation Desert Storm began with a clear violation of Westphalian norms when Saddam Hussein commanded his army to invade Kuwait on August 1, 1990. Iraq's invasion of Kuwait was more than a mere border violation—it was a brutal occupation. By December 15, the *New York Times* reported, Kuwaitis were being subjected to looting, rape, torture and executions."[257] After the liberation of Kuwait, one doctor relayed his observations. "You would see heads that were completely unvaulted, with no brains in the skull, or multiple fractures in each arm, or severe burns in the face and body, or fingernails removed. The signs of torture I saw from the thirty-eight executions [included] electrical burns, where wires had been put on the chest wall and near the genitals, and cigarette burns anywhere on the body, massive bruising, and… bullets in the shoulders, kneecaps, hip, and legs."[258] The Iraqi occupation of Kuwait was unrestricted savagery as a rule.

America elected to fight.

G.H.W. Bush outlined the justice and purpose of war before Congress on September 13, 1990. The strategists received four objectives from the President:

1. Iraq's Withdrawal from Kuwait
2. Restoration of the legitimate Kuwaiti government
3. Security and stability in the Persian Gulf
4. The safety of Americans abroad.[259]

While reasonable people may disagree, and choose larger time frames to judge victory, the strategy discussed in the following pages led to a "victory [that] accomplished all of

[257] Judith Miller, "Atrocities by Iraqis in Kuwait: Numbers Are Hard to Verify," *The New York Times*, (December 16, 1990).
[258] Michael Kelly, "The Rape and Rescue of Kuwait" *The New Republic* (March 24, 1991), http://www.newrepublic.com/article/archive/politics/76724/rape-rescue-kuwait-iraq-saddam-hussein, (accessed March 31, 2015).
[259] Diane T. Putney, *Airpower Advantage: Planning the Gulf War Air Campaign 1989 -1991* (Washington DC: Air Force History and Museums Program), 51.

these goals." The Gulf War also eliminated Iraq's ability to invade Saudi Arabia—a Presidential concern before the war due to the vision of Saddam Hussein in charge of Kuwaiti and Saudi Arabian oil reserves.[260] The military objectives derived from these political objectives can be found in an early form of the "Instant Thunder" air campaign planning: force Iraqi withdrawal from Kuwait, degrade Iraq's offensive capability, secure oil facilities, and render Hussein ineffective as an Arab leader.[261]

On January 16, 1991, a solar eclipse spanned the southern hemisphere as coalition air power marshaled over Iraq that night. An elaborate theory of action led to specific ways that drove how the US used means to achieve ends. The war lasted 42 days—38 days of air war and a 100-hour ground war.[262] The US Air Force built for AirLand battle during the Cold War savaged the fifth largest army in the world. Approximate bomb tonnage dropped on Iraq was 88, 500 total tons[263] compared with 2.5M in World War II and, 8M tons in Vietnam.[264] The result was the temporary paralysis of Iraq and the destruction of the Iraqi military in Kuwait marked by the Battle of Kafji and the "Highway of Death." On February 28, President Bush declared Kuwait liberated and initiated a cease-fire that led to a signed peace agreement in coalition-occupied Iraq.

Operation Desert Storm provides a solid example of how the esoteric realm of theory can become suddenly concrete. All levels of theory—multidisciplinary, general strategic theory, paradigms, and theories of action—combined to mold the ways selected

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[260] Richard Alan Schwartz, *Encyclopedia of the Persian Gulf War* (Jefferson, North Carolina: McFarland & Company, Inc. Publishers,1998), 111. This page also includes the quote about accomplishing the President's goals.
[261] Richard T. Reynolds, *Heart of the Storm: The Genesis of the Air Campaign Against Iraq* (Maxwell Air Force Base, Alabama: Air University Press, 1995), 29.
[262] Kevin M. Woods, *The Mother of All Battles: Saddam Hussein's Strategic Plan for the Persian Gulf War* (Annapolis, MD: Naval Institute Press, 2008), 3-9.
[263] John A. Warden III, personal conversation (May 28, 2015).
[264] Mark Clodfelter, personal conversation (May 29, 2015).

for the coalition response. Figure 5 offers a concept map illustrating the theoretical notions guiding this air strategy for Gulf War I. Many of those concepts stem from the work of one National War College graduate, Air Force Col John Warden. He published his 1986 war college paper in 1988 as *The Air Campaign*, a book now translated into more than six languages.[265] As Diane Putney noted in her history of the Gulf War, "Under Colonel Warden's leadership, Checkmate [the planning cell] produced Instant Thunder."[266]

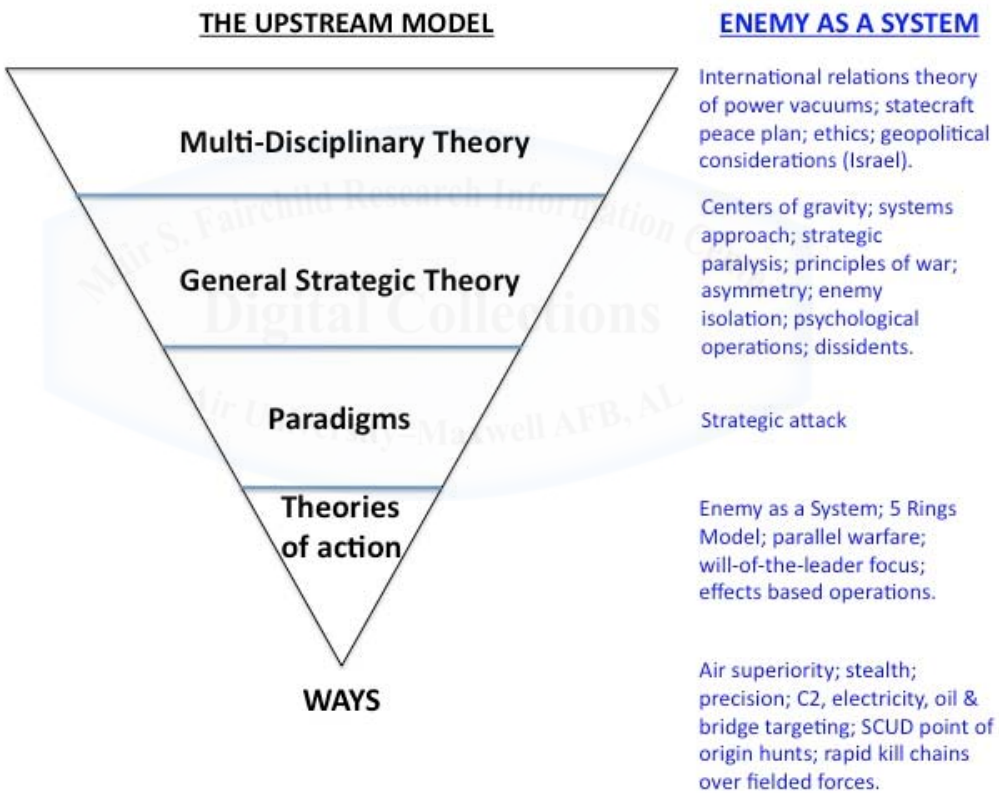

Figure 10: The Upstream Model for Enemy as a System

[265] John A. Warden III, *The Air Campaign* (Lincoln, Nebraska: toExcel, 2000), x.
[266] Putney, *Airpower Advantage*, 119.

This plan, whose name was chosen to contrast with the flawed "graduated response" strategy of Vietnam's Rolling Thunder campaign, embodied the essence of a quick-strike air plan as the centerpiece for Operation Desert Storm.[267]

Level 1: Multi-Disciplinary Theory in Gulf War I

Three clear examples of multidisciplinary theory contributed to the ways that guided Gulf War air strategy. First (and also relevant for assessing Iraq in 2016), were persistent discussions on how to avoid a *power vacuum* in the Middle East. Warden first learned "balance of power theory" as a United States Air Force Academy cadet. His understanding of international relations concepts grew from reading two books at Texas Tech in 1975 while earning a master's degree in political science. Henry Kissinger's *A World Restored* portrayed the balance of power scheme guiding Europe after the Napoleonic wars. Fred Hartmann, Warden's Texas Tech advisor and mentor, wrote *The Relations of Nations* (which entered its 5th edition three years later in 1978). Both books warned Warden about the dangers of creating power vacuums amidst competing states. "My conclusion was that balance of power was the international relations approach most likely to lead to long-term success at the least cost. The idea that Iraq in Gulf War I should not be turned into a power vacuum seemed pretty clear to me."[268]

An emphasis on top-down thinking complemented Warden's desire to avoid a power vacuum in Iraq. He wrote: "[It is] top-down thinking from the big picture to the small rather than the bottom-up thinking that serves us so well when we deal with tactical

[267] For further information on how Instant Thunder fit into Operation Desert Storm see Putney, *Airpower Advantage*, Chapter 5 and Richard T. Reynolds, *Heart of the Storm: The Genesis of the Air Campaign Against Iraq* (Maxwell Air Force Base, Alabama: Air University Press, 1995).
[268] John A. Warden III, personal conversation (March 31, 2015).

issues."[269] A "higher level" perspective presented perhaps a more strategic aperture from which to view a problem. To Warden, the invasion of Kuwait was the smaller matter; the peace afterwards was the larger concern.[270] He further turned to the history of World War II for guidance about dealing with the Iraqi invasion of Kuwait:

> [We] were also heavily influenced by the debates (contemporaneous and later) of the impact of unconditional surrender on both Germany and Japan. Our discussions ranged from Nicholas Spykman's 1940-41 injunctions about not destroying the balance of power in Europe through the whole set of arguments for unconditional surrender. We concluded that it was imperative to not leave a power vacuum in the area; therefore, the idea of eliminating Iraq as a state made no sense.[271]

Observers were later confused why coalition air power delivered only 330 weapons on Baghdad per se.[272] Preserving the Iraqi state was a key goal of American strategy and thus, infused every aspect of the targeting rationale in Operation Desert Storm. The war in 1991 clearly was not for unconditional surrender. President Bush had no intention of risking that Iran—a long-term enemy of the United States—would dominate the territory of a prostrate Iraq.

A second mutli-disciplinary approach relied on the tenets of diplomacy to craft a *peace plan before the war* that the Iraqis would likely find acceptable to end the war. Warden's strategists used the tentative peace plan as a measuring stick to shape the desired outcomes of the air campaign. "A little bit later in the planning process, we got fairly heavily into discussing peace terms and trying to work out a set of peace plans so

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[269] John A. Warden III, "The Enemy as a System," *Airpower Journal* 9 (Spring 1995), 40.
[270] Putney, *Airpower Advantage*, 36. Putney documents how Warden's Texas Tech thesis emphasized three lessons drawn from the work of Liddell-Hart: conduct war to shape the peace; identify and strike the Achilles Heel; and compel the enemy to capitulate.
[271] John A. Warden III, "The Gulf War: How WWII Lessons Influenced Planning and Execution," in *From Total War to Total Victory*, Steven Weingartner, ed. (Wheaton, Illinois: Cantigny First Division Foundation, 2005), 281.
[272] William M. Arkin, "Baghdad: The Urban Sanctuary in Desert Storm?" *Airpower Journal* (Spring 1997), 5.

that we would have something well before the war began to guide us in the negotiations that we anticipated having with the Iraqis."[273] Creating a "future picture" from which to work backwards became a fundamental part of Warden's approach to strategy-making.[274] In the 2000 epilogue to *The Air Campaign*, he wrote: "The proposals made to General [Norman] Schwarzkopf on the 10th of August 1990 flowed from a very specific view of the peace that should follow a war with Iraq."[275]

After graduating from National War College in 1986, Warden commanded the 36th Tactical Fighter Wing in Bitburg, Germany, and then returned to the Pentagon's Air Staff as a colonel; he had previously served as a major there in the Middle East plans division in 1975. In 1989, he helped oversee the Air Staff's Directorate of Warfighting concepts, where he could devote time to fleshing out many of the ideas that he had developed. One striking aspect of routine operations on the Air Staff was the lack of a common framework for creating strategy. Specifically, Warden believed that the strategy design process omitted the essential step of envisioning a detailed "future picture" to which all operations should align. This future picture was more than a goal or vision. His concept of a future picture led strategists to ask, what do we want the world to actually look like when we are done implementing the strategy?[276] Warden's collection of Gulf War strategists and planners were multi-disciplinary enough to do exactly that,

[273] John A. Warden III, "The Gulf War: How WWII Lessons Influenced Planning and Execution," in *From Total War to Total Victory*, Steven Weingartner, ed. (Wheaton, Illinois: Cantigny First Division Foundation, 2005), 281.
[274] See John A. Warden, John and Leland Russell. *Winning in Fasttime: Harness the Competitive Advantage of Prometheus in Business and Life* (Montgomery, AL: Venturist Publishing, 2002). The authors offer a detailed strategy development framework called Prometheus which is a "forward-back" model that uses a detailed future picture process as one of the main elements in the method. The future picture is not a vision or a hope, it is a specfic "architectual" question that asks, what do we want the world will look like when we are done?
[275] Warden, *The Air Campaign*, 145.
[276] John A. Warden III, personal conversation (March 11, 2015).

even though none of them ranked higher than a colonel. Nevertheless, they began their planning by specifying the terms required for a settlement.

Finally, as in World War II, the subject of *ethics* influenced the initial Gulf War strategy in two principle ways. First, while ethics may be "the dog that does not bark" during war,[277] it is certainly the dog that comes back to bite afterward. The perceived lessons of World War II had Warden searching for a more ethical manner of bombing in much the same way that industrial web theorists had progressive notions after the slaughter in trench warfare of World War I. Warden understood that the Iraq war would not aim for unconditional surrender, and thus, coalition forces would attack only the Iraqi military—and political leaders like Saddam--not the populace. Warden's planners "went to extraordinary lengths to reduce the numbers of civilian casualties and collateral damage. The later reaction to British—and to a lesser extent American—bombing in World War II helped us to clarify our thinking in this area."[278]

On the other hand, Warden's strategy incorporated leadership targeting—discussed in this chapter's "theory of action" section—that begged ethical questions. Such questions surfaced when Warden presented the Instant Thunder campaign strategy to the Joint Forces Air Component Commander (JFACC), Air Force Lt Gen Charles Horner, in August 1990. Horner claimed having "a little trouble" with the optics of "severing the head from the body."[279] This comment marked the beginning of a persistent misunderstanding about Warden's view of leadership targeting in his theory of

[277] Colin Gray, *Modern Strategy* (Oxford: Oxford University Press, 1999), 68-74. Gray argued that planners subsumed ethical values into war plans based on the perceived threat faced, and thus the "ethical dog did not bark" independently.
[278] John A. Warden III, "The Gulf War: How WWII Lessons Influenced Planning and Execution," in *From Total War to Total Victory*, Steven Weingartner, ed. (Wheaton, Illinois: Cantigny First Division Foundation, 2005), 283.
[279] Putney, *Airpower Advantage*, 126.

action. Even though Warden consistently claimed that the death of Saddam Hussein was not essential to the strategy, Horner and later critics would term Warden's concept "decapitation."[280] Horner concluded that such a plan as conceived "would incur a 200-year penalty because non-Arabs attacked Iraq" in this manner.[281] In the end, progressive ideals of minimizing casualties by shortening a war combined with highly selective targeting to leave an Iraqi state intact and avoid a power vacuum.

Level 2: General Strategic Theory

In terms of general strategic theory, no less than 7 distinct concepts contributed to the design of Gulf War strategy. First, the *principles of war* influenced strategy development. Three principles in particular affected the ways chosen to secure political objectives. *Stealth* aircraft and weapons brought the old principle of surprise to warfare in a new form.[282] While *precision* was not listed among the classic principles of war, *concentration* was, and the impact of precision in air theory placed mass at a decisive point with ordnance. New precision-guided munitions (PGMs) in the Gulf War assured that concentration would occur where it was needed the most. *Penetration* further enabled concentration by allowing the US to destroy virtually any object on or under the earth. Penetration was either a new aspect of concentration or a new principle. When combined, Surprise (in the form of stealth) and concentration (in the form of precision

[280] For more information on the misunderstanding see Robert Pape's *Bombing to Win* and essay exchanges between Warden and Pape in *Security Studies*, vol 7, issue 2, Frank Cass Publication (Winter 1997/1998); John A. Warden III, "Success in Modern War: A Response to Robert Pape's *Bombing to Win*," and Robert A. Pape "The Air Force Strikes Back: A Reply to Barry Watts and John Warden."
[281] Putney, *Airpower Advantage*, 128.
[282] Headquarters Department of the Army, *Operations*, FM 3-0 (Feb 27, 2008), A-3. The principle of surprise allows a force to "Strike the enemy at a time or place or in a manner for which he is unprepared. Surprise can decisively shift the balance of combat power. By seeking surprise, forces can achieve success well out of proportion to the effort expended."

and penetration) drove the characteristics of the Gulf War strategy. Warden wrote in 1992, "Stealth has reinstated surprise to air war; precision has lowered the number of sorties required by orders of magnitude; and penetration has made almost all targets vulnerable."[283]

In addition to surprise and concentration, the *offensive* was a third principle guiding Gulf War strategy. This principle is defined as seizing and holding the initiative while maintaining freedom of action and achieving decisive results.[284] The principle of the offensive stirred inside Warden in a most unique manner. He was on a cruise ship with his wife in the Caribbean when he learned of the Kuwait invasion over the Ocean News Network. From that moment it would be another 36 hours of meditating with coffee while overlooking the ocean before he could fly back to Washington for what he believed would be an inevitable military response from the United States. During that long wait, he reflected how the standing plans for the region were defensive in nature and geared toward the important work of defending American ground forces. As the Air Force's deputy director for Warfighting Concepts, he was determined to craft a strategy that injected the principle of the offensive in the form of the air campaign.[285] Warden would later write that hyper war (or "parallel warfare," a term he preferred), combining vast numbers of simultaneous attacks through the air, made "the premium for striking first higher than ever."[286]

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[283] John A. Warden III, "Employing Air Power in the Twenty-first Century," in *The Future of Airpower in the Aftermath of the Gulf War*, Richard H. Shultz Jr. and Robert L. Pfaltzgraff Jr. eds. (Maxwell AFB, AL: Air University Press, 1992), 80.
[284] Headquarters Department of the Army, *Operations*, FM 3-0 (Feb 27, 2008), A-1.
[285] Richard T. Reynolds, *Heart of the Storm*: *The Genesis of the Air Campaign Against Iraq* (Maxwell AFB, AL: Air University Press, 1995), 15.
[286] John A. Warden III, "Employing Air Power in the Twenty-first Century," in *The Future of Airpower in the Aftermath of the Gulf War*, Richard H. Shultz Jr. and Robert L. Pfaltzgraff Jr. eds. (Maxwell AFB, AL: Air University Press, 1992), 79.

In addition to these three principles of war, Warden borrowed a general theory page from Clausewitz regarding *centers of gravity*. Clausewitz uses this phrase nine times in his classic *On War*,[287] remarking that it is "the hub of all power and movement, on which everything depends. That is the point against which all our energies should be directed."[288] While writing as a National War College student, Warden described center of gravity as "a point against which a level of effort… will accomplish more than that same level of effort could accomplish if applied elsewhere."[289] Early in his strategic development, Warden determined that the center of gravity concept meant that some enemy attributes were significant, simply more important than others. At an instinctive level, Warden also inferred meaning about centers of gravity from the basics of aeronautics, where an airplane's center of gravity was germane to how it handles in flight.[290] Warden's "5 Rings Model" naturally flowed from this general strategic concept.

Warden carefully employed the center of gravity concept from Clausewitz. First, Warden took the view that many centers of gravity exist rather than one "panacea" target. Every state, he observed, is unique.[291] As a result, in some cases a panacea target may actually exist, and if so, it should be eliminated or severed from the rest of the enemy system (discussed further in the case of Operation Allied Force).[292] Yet Warden's inclination was to look for a set of centers across five basic functions of an enemy system[293] rather than one "silver bullet" target. Second, Warden was careful to consider

[287] Clausewitz, *On War*, 71, 248, 391, 595, 617, 618 (twice), 619, 633.
[288] Clausewitz, *On War*, 71, 595.
[289] Warden III, *The Air Campaign*, 7.
[290] John A. Warden III, personal conversation (March 11, 2015).
[291] John A. Warden III, "The Enemy as a System." *Airpower Journal* 9 (Spring 1995), 49.
[292] John A. Warden III, *The Air Campaign* (Lincoln, Nebraska: toExcel, 2000), 37.
[293] Leadership, organic essentials/means of production, infrastructure, population, and fielded forces.

the context in which Clausewitz wrote—one where the actual clash of fielded forces was the norm. Thus, Clausewitz "tended to focus his attention on the actual clash of men and to see that clash as the dominant form of war" since it was the form of war in his day.[294] Airpower enabled an "over not through" rationality and Warden questioned if "the actual clash of men on the front is the only way or the best way to wage war."[295]

A third "general theory" concept that affected Desert Storm strategy was the notion of a *systems approach*. Warden remembered that nothing was new about this approach. In fact, the systems approach had developed over a long period of time with diverse applications. As Iraq invaded Kuwait, Peter Senge published his classic work, *The Fifth Discipline,* where he identified "systems thinking" as the most important skill in managing large learning organizations.[296] Warden's tenuous appreciation of the systems approach came from J.F.C. Fuller's *The Generalship of Alexander the Great*. Warden the-strategy-student was impressed by Alexander's innate sense of how "bigger pictures" fit together. Fuller may not have used the word "system," but he taught Warden that many related elements lead to success and these elements comprise something like a system. This revelation was a multi-disciplinary insight that grand strategy, to be successful, needed to follow a systems approach that included multiple related activities, all designed to achieve the same outcome. Warden's coursework in thermodynamics and engineering at the Air Force Academy bolstered his excitement about a systems approach to war.[297]

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[294] John A. Warden III, "Employing Air Power in the Twenty-first Century," in *The Future of Airpower in the Aftermath of the Gulf War*, Richard H. Shultz Jr. and Robert L. Pfaltzgraff Jr. eds. (Maxwell AFB, AL: Air University Press, 1992), 62.
[295] Ibid., 62.
[296] Peter M. Senge, *The Fifth Discipline: The Art and Practice of the Learning Organization*, rev. and updated. ed. (New York: Doubleday/Currency, 2006), 57.
[297] John A. Warden III, personal conversation (March 11, 2015).

The concept of *strategic paralysis* stemmed from general theory and played a key role in Warden's "specific theory of action" for the Gulf War. Strategic paralysis was actually an ancient concept stemming from *The Iliad*. The war hero Achilles was invincible except for his heel where a blow would prove mortal by paralyzing him. Basil H. Liddell-Hart relates the Achilles story in *Paris; or The Future of War*, noting in 1925 that the tank and the airplane, much like Paris's arrow into Achilles, now offered the means to paralyze an enemy's military and its society. In his later book on general strategic theory, Liddell-Hart states that strategic paralysis should be a normal aim in war: "A strategist should think in terms of paralyzing, not of killing."[298] Liddell Hart also referred to this paralysis as "psychological dislocation."[299]

Air Force Lt Gen (ret) David Fadok elaborated how Cols John Boyd and Warden solidified the concept of strategic paralysis for a generation of Air Force officers (Boyd's work also receives honorable mention in Gray's classics of general strategic theory). Boyd's fundamental explanation of a decision-making process was his Observe-Orient-Decide-Act (OODA) loop; break that chain of events, denying enemy leadership the time to cope mentally with rapidly unfolding attacks in war, and psychological paralysis results.[300] Warden's theory of action was a prescriptive guide about how to actually achieve paralysis from the air. John Andreas Olsen and others argue that imposing

[298] Basil Henry Liddell-Hart, *Strategy: The Indirect Approach*, 4th ed. (London: Faber, 1967), 212.
[299] Liddell-Hart, *Strategy*, 326-328. Psychological dislocation parallells Boyd's concept of imploding and enemy's OODA loop.
[300] Grant Tedrick Hammond, *The Mind of War: John Boyd and American Security* (Washington, DC: Smithsonian Institution Press, 2001), 2. David S. Fadok, "John Boyd and John Warden: Airpower's Quest for Strategic Paralysis," in Phillip S. Meilinger, ed., *The Paths of Heaven The Evolution of Airpower Theory* (Maxwell AFB, AL: Air University Press, 1997), 364.

systemic paralysis from the air is an alternative to millennia of land-centric attrition and destruction strategies.[301]

Saddam Hussein acknowledged that his forces were disoriented during the 1991 war when questioned during his 2004 captivity. In a previously classified document, an interrogator asked Hussein if he was surprised at the number of Iraqi prisoners of war taken by coalition forces—86,743. Hussein replied, "No. This is war." He went on to explain that his forces were not captured by force in the classic sense. Many factors added up to their capture including "loss of communication and transportation, a lack of food and a sense of disorientation."[302] This represents a class enemy-centric description of psychological dislocation which was a central part of Desert Storm theory. Hussein went on to note that the "Shock and Awe" attacks of 2003 were worse than 1991 but there were fewer Iraqi POWs in 2003. Hussein attributed this difference to these different disorientation factors that existed in 1991.[303]

In addition to principles of war, centers of gravity, the systems approach, and strategic paralysis, several other "general theory" concepts helped mold strategy for Operation Desert Storm. Warden applied the notion of *Army isolation* from reading about the World War II Island-Hopping Campaign in the Pacific. Army isolation aimed to make large portions of a fielded force simply irrelevant. Regarding this concept, Warden wrote, "MacArthur's island hopping campaign, which left large numbers of enemy troops intact but useless, helped us to develop concepts of isolation and helped us

[301] John Andreas Olsen, *Airpower Reborn: The Strategic Concepts of John Warden and John Boyd* (Annapolis: Naval Institute Press, 2015), 5.
[302] Federal Bureau of Investigation (FBI) interviews with Iraqi President Saddam Hussein from 2/7-6/28/2004 from his detention cell at the Baghdad Operations Center and at a military detention facility at Baghdad International Airport (BIAP), (United States: Federal Bureau Of Investigation, 2004), 5 March 2014 interview, 2. *U.S. Declassified Documents Online*, accessed 20 Feb. 2016.
[303] FBI interviews, 5 March 2014, 3. *U.S. Declassified Documents Online*, accessed 20 Feb. 2016.

to explain, to ourselves and others, what might happen when units found themselves isolated and out of touch with higher headquarters."[304] Warden amplified army isolation with language that mirrored the preferences of both Liddell Hart and Sun Tzu for the *indirect approach*. "As strategists and operational artists, we must rid ourselves of the idea that the central feature of war is the clash of military forces," Warden argued. "In strategic war, a clash may well take place, but it is not always necessary, should normally be avoided, and is almost always a means to an end and not an end in itself."[305] Indeed, Hussein's only concern in the war was the all-vector menace of U.S. airpower isolating and interdicting his army in Kuwait.[306]

Warden and his planners also transferred value from both *psychological operations* and *leveraging dissidents*. In developing strategy, General Schwarzkopf, Warden, and their staff officers were adamant about the need for a strategic-level psychological operation that would confuse Hussein even more than he would be when the air campaign turned off his lights and communications. Warden later wrote "at our first briefing to General Schwarzkopf, we said very explicitly that the strategic psychological operations campaign was entirely as important as the bombing campaign."[307] Finally, the Gulf War strategists assessed that dissidents were not well accounted for in World War II. Nevertheless, Desert Storm did *not* rely on dissidents.[308] Instead, dissidents would simply be tracked, supported, and welcomed (such as the Shia and Kurdish uprisings beginning soon after the war).

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[304] John A. Warden III, "The Gulf War: How WWII Lessons Influenced Planning and Execution," in *From Total War to Total Victory*, Steven Weingartner, ed. (Wheaton, Illinois: Cantigny First Division Foundation, 2005), 284.
[305] John A. Warden III, "The Enemy as a System." *Airpower Journal* 9 (Spring 1995), 41.
[306] FBI interviews, 3 March 2014, 2. *U.S. Declassified Documents Online*, accessed 20 Feb. 2016.
[307] Warden, *The Air Campaign*, 154 (2000 Epilogue to the new edition).
[308] Warden, *The Air Campaign*, 154 (2000 Epilogue to the new edition).

Level 3: A Paradigm Shift

At the third level of theory, a paradigm shift occurred among strategists designing the air campaign. As Edward Luttwak wrote, "it is obvious that the bombing of Iraq was qualitatively different from that seen in all previous wars."[309] Further, this difference cannot be explained away entirely by new airplanes and weapons. Warden honored the contributions of previous airpower thinkers,[310] but he felt boxed in by the strategic bombing paradigm à la World War II and Vietnam. Further, a detailed look at the planning process in 1990 before the war shows great resistance surrounding Warden's model that mirrors how Thomas Kuhn says a doctrinal community reacts to bold new ideas.[311] The exact name of the new paradigm is subject to debate, with "strategic attack" later becoming the doctrinal term for it,[312] and "strategic conversion" being the name that makes sense to John Warden today.[313]

Since paradigms are models of accepted or emerging practice, a comparison with the strategic bombing paradigm shows that a shift was indeed taking place. There is no

[309] Edward N. Luttwak, "Airpower in US Military Strategy," in *The Future of Airpower in the Aftermath of the Gulf War*, Richard H. Shultz Jr. and Robert L. Pfaltzgraff Jr. eds. (Maxwell AFB, AL: Air University Press, 1992), 20.
[310] Dag Henriksen, *NATO's Gamble: Combining Diplomacy and Airpower in the Kosovo Crisis 1998-1999* (Annapolis, MD: Naval Institute Press, 2007), 55.
[311] For a detailed account of opposition to the new paradigm see Richard T. Reynolds, *Heart of the Storm* (Maxwell AFB, AL: Air University Press, 1995). Negative reactions to Warden's model were numerous and came from inside and outside the Air Force. While opposition to the revolutionary himself may explain some of these reactions, the majority appears to be skepticism for the new approach and the overwhelming impact that it had on Instant Thunder strategy. For Kuhn's description of community turmoil during times of paradigm shift see Thomas Kuhn, *The Structure of Scientific Revolutions* (Chicago: University of Chicago, 1970), 66-76, 79. New paradigms are constructive and destructive. While they offer something new, the old paradigm—and those who belong to it—may be destroyed. Kuhn labeled the fundamental conflict between paradigm shifters and old paradigm subscribers as the "essential tension" between traditional science and revolutionary science.
[312] Air Force Doctrine Document 2-1.3, *Counterland Operations* (2006), 12.
[313] John A. Warden III, personal conversation (March 11, 2015).

doubt that technology mattered in part as new means enabled new ways. The "Second Offset" capabilities of "near-zero CEP weapons," stealth aircraft, global positioning satellites negating weather, and the Assault Breaker/JSTARS program allowed for a new concept that Russian General Nikolai Ogarkov called the "Reconnaissance-Strike Complex."[314] The combination of capabilities allowed the U.S. to find, fix, and finish any moving thing in a 10,000 square mile area—the search area of a JSTARS. These advances in technology caused Warden and his cohorts to re-examine the fundamental tenets supporting the strategic bombing paradigm and determine that new aerial capability demanded a new way of thinking about how to use it. The air force strategists of World War II would have dreamed about having the American Air Force of 1990 and Warden pays great respect to that distinction. Yet, as John Andreas Olsen notes, "the transformation [in the use of aipower] did not result solely from advanced, state-of-the-art technology… but from an innovative concept that serviced as the basis of planning and application."[315]

Four important changes marked a subtle paradigm shift that began to emerge after America's strategic bombing campaigns against North Vietnam. The first was the distinction between subsystem destruction and system-wide conversion. In the strategic bombing paradigm, US airmen set out primarily to destroy the industrial capability to produce or transport war materials in accordance with Industrial Web Theory (the goal of indirectly wrecking civilian will was secondary). In the strategic attack paradigm, airmen

[314] See Mary C. Fitzgerald, *Marshal Ogarkov on the Modern Theater Operation*. No. CRM-86-238. Center for Naval Analysis (Alexandria, VA Naval Warfare Operations Division, 1986), 11-20; and David M.,Glantz, and Harold S. Orenstein, *The Evolution of Soviet Operational Art, 1927-1991: The Documentary Basis: Volume 2 (Operational Art 1927-1964).* Vol. 6., (Routledge, 2013), 250, 304, 353, 354.
[315] Olsen, *Airpower Reborn*, 1.

set out to reshape an enemy's entire national system—particularly its leadership—to achieve the desired ends as quickly as possible.

This focus on leadership marked the second aspect of the paradigm shift. In the strategic bombing paradigm, US airmen lacked the precision, stealth, and penetration to systematically attack or isolate German or Japanese leadership except in rare instances. In the strategic attack paradigm, airmen possessed the capability to make enemy leadership persistently deaf, blind, and mute through a direct, systematic targeting methodology.

The approach to attacking enemy will highlighted a third element of the paradigm shift. In the strategic bombing paradigm, the goal was to wreck poplular will by destroying key aspects of military capability also essential for normal day-to-day life (Industrial Web Theory) or break the will of the people by targeting them directly, who in turn pressure the government to end the war (Moral Effect Theory). In the strategic attack paradigm, Warden eschewed attacking popular will in *any* manner. Instead, he aimed to bend the will of the enemy's *leadership* through direct attack, since only the leadership could offer concessions that could terminate a war.[316]

The fourth characteristic of the paradigm shift was an emphasis on parallel instead of serial warfare. In the strategic bombing paradigm, US airmen could generally bomb target sets only one day at a time as they sought to achieve cumulative effects against a single sub-system in the enemy's industrial web. In the strategic attack paradigm, airmen

[316] Warden, "Enemy As a System," 49. For further reading on the elusive subject of enemy will see Mark Clodfelter, "Aiming to Break Will: America's World War II Bombing of German Morale and its Ramifications," *The Journal of Strategic Studies*, vol. 33, no. 3, 401-435 (June 2010).

had both the capability *and* strategy to attack multiple enemy sub-systems simultaneously to psychologically dislocate leaders.[317]

Why does identifying a paradigm shift matter in terms of the theory to strategy model? The shift to the strategic attack paradigm allowed Warden to see a theory of action for the Gulf War that would have been difficult to envision otherwise. Thomas Kuhn refers to this phenomenon as the "invisibility of revolutions." A new set of questions and concepts leads a "reorientation toward the field, a reorientation [that teaches strategists] to ask new questions about, and to draw new conclusions from, old data." Kuhn goes on to explain that the combination of new theory with facts allows practitioners to see, through a "revolutionary reformulation," new applications that were concealed from the previous tradition/paradigm.[318] Before Kuhn, Albert Einstein made the same point. "Whether you can observe a thing or not depends on the theory which you use. It is the theory which decides what can be observed."[319] This power of perspective from theory is precisely how the changes in the strategic bombing paradigm allowed Warden and his team to see a new theory of action that suited the character of their war.

[317] The intellectual history of parallel warfare will be discussed further in the theory of action section. Parallel warfare is a boundary concept between paradigm and theory of action. In this case, parallel warfare was found in the theory of action but it was also a central theme of the paradigm shift that was occurring at the same time. It is normal for new paradigms to begin first at the theory of action level before it is an accepted doctrine in a stable paradigm. As such it could be viewed that Warden's concept of parallel warfare *began to shift* the strategic bombing paradigm and Operation Allied Force later took place *within the new* strategic attack paradigm.

[318] Thomas Kuhn, *The Structure of Scientific Revolutions* (Chicago: University of Chicago, 1970), 140, 141.

[319] Albert Einstein quoted in Abdus Salam, *Unification of Fundamental Forces* (Cambridge: Cambridge University Press, 1990). Einstein quote during Werner Heisenberg's 1926 lecture at Berlin, related by Heisenberg.

For the strategy student, the ability to discern a paradigm shift is a critical skill; the name given the new paradigm is not. Understanding how paradigms emerge, and how they can limit—or expand—strategic options are difficult skills to master, to say the least. Doing so requires pinpointing changes in the character of war—a key talent that Giulio Douhet acknowledged almost a century ago.[320]

Level 4: The Enemy as a System

Warden's theory of action that guided the logic of the Gulf War air strategy was the "Enemy as a System." The Enemy as a System combined five distinctive concepts tailored to the changing character of war: the 5 Rings Model, parallel warfare, leadership targeting, effects-based rationality, and specific targeting precepts (apart from those that were already transferred from the principles of war).

The 5 Rings Model is the most salient visual of Warden's theory of action. This model was a special application of the centers of gravity concept from the "general theory" level. By itself, the 5-Rings Model is not a targeting guide. It is rather a simplification of how any organization works. Each organization has leadership, subsistence resources, infrastructure, a population it serves, and a way to protect it. The 5-Rings Model is a way to approximate the complexity of the enemy system. Warden wrote, "The best models at the strategic level are those that give us the simplest possible big picture. As we need more detail, we expand portions of our model so that we can see finer and finer detail." Warden designed his model in the spirit of Einstein's maxim,

[320] For a foundational work on how paradigms emerge in the specific form of military doctrine see Barry Posen, *The Sources of Military Doctrine: France, Britain, and Germany between the World Wars*, Cornell Studies in Security Affairs (Ithaca: Cornell University Press, 1984). The Douhet quote on this subject, which opens the introduction to this research, is found in *The Command of the Air*, p 30.

"Everything should be made as simple as possible, but no simpler."[321]

Ironically, the genesis of the 5-Rings Model was not Iraq's invasion of Kuwait, but rather a different problem: Air Staff activity to explain how best to use the Air Force. In the 1986 paper that became *The Air Campaign*, Warden cataloged various types of CoGs to guide an air campaign. When he later arrived at the Pentagon, his superiors challenged him to explain the role of the Air Force in the nation's wartime military establishment. Before explaining what the Air Force could do to an enemy, Warden had to first outline how to dissect a potential opponent. The 5 Rings Model demonstrated how the Air Force could "get results across the entire enemy system" and showed, "what has to happen to an opponent to be successful in war." Numerous Air Staff discussions, briefings, and exercises like a Fulda Gap[322] scenario helped refine the model.[323] When Saddam Hussein invaded Kuwait, the model was available for its first use in guiding real-world strategy development.

While the 5 Rings Model was the most salient, *parallel warfare* was the most significant new concept in Warden's theory of action. The notion called for simultaneously attacking centers of gravity across every key function of the enemy system to cause temporary paralysis.[324] An early form of the concept had appeared in

[321] Albert Einstein quoted in Roger Sessions "How a 'Difficult' Composer Gets that Way; Harpsichordist," *New York Times* (8 January 1950), 89.
[322] The Fulda Gap is an inter-mountain passage in central Germany around the Vogelsberg Mountains. It is named after the Germany town of Fulda which is situated along this passage. During the Cold War, the Fulda Gap was famously prominent in NATO thinking as one of the most likely avenues of approach for a Soviet tank attack through Eastern Germany into Europe.
[323] John A. Warden III, personal conversation (March 11, 2015).
[324] John A. Warden III, personal correspondence, (April 14, 2015). John Warden emphasized the parallel war concept is not just simultaneity nor the 5 rings. "The whole concept of "parallel attack" should be seen not just as bringing many targets under near-simultaneous attack, but also and equally important bringing as many categories of centers of gravity under attack to achieve the system change needed to realize the "Future Picture" as quickly as possible."

Warden's *The Air Campaign*. "Every level of warfare has a center, or centers, of gravity. If several centers of gravity are involved, force must be applied to all if the object is to be moved."[325] Air Force doctrine writers later discussed the concept between 1988-1989 to revise what would become the 1992 version of "Air Force Basic Doctrine 1-1."[326] The concept was not known as parallel warfare when the Gulf War began. Yet the unnamed concept was so influential that Warden and his assistants named the draft plan *Instant* Thunder to represent the simultaneity of attacks across all enemy systems and thus distinguish the draft strategy from its Vietnam counterpart *Rolling* Thunder.[327] Warden stated this idea emphatically in the hasty kick-off meeting to draft an air campaign at the request of General Schwarzkopf. "This is not your Rolling Thunder. This is real war, and one of the things we want to emphasize right from the beginning is that this is not Vietnam! This is doing it right! This is using air power!"[328]

On the eve of the conflict, Warden remembered the parallel war concept this way: "We were thinking about J.F.C. Fuller's plan to take down German C2 and logistics behind the lines before a major offensive on the ground. We knew conceptually what we had to do to accomplish this but we didn't put a term to that [at that time]."[329] After the success of the Gulf War, Warden's team still searched for the right term. Warden used the phrase "hyper war" to mean the combination of "high technology, unprecedented

[325] Warden, *The Air Campaign*, 10.
[326] John A. Warden III, personal conversation (March 11, 2015). While the 1984 version of Air Force Basic Doctrine 1-1 was not published until 1992, the doctrine officers on Air Staff were drafting changes as early as 1988.
[327] Edward N. Lutwak, "Air Power in US Military Strategy," in *The Future of Airpower in the Aftermath of the Gulf War*, Richard H. Shultz Jr. and Robert L. Pfaltzgraff Jr. eds. (Maxwell AFB, AL: Air University Press, 1992), 25.
[328] Reynolds, *Heart of the Storm*, 28-29. On the morning of August 8, 1990, Warden assembled an initial team of about 30 officers including Lt Col Dave Deptula. This quote is sourced from a October 22, 1991 interview with John Warden.
[329] John A. Warden III, personal conversation (March 11, 2015).

accuracy, operational and strategic surprise through stealth, and the ability to *bring all of the enemy's key operational and strategic nodes under near-simultaneous attack*" (emphasis added).[330] In the months after the war, Warden's planners provided numerous briefings to explain the theory of action used in the air campaign. Dr. Andy Marshall's Office of Net Assessment received one such briefing, with the room teaming with thinkers from around the DoD. During that session, one of Warden's key deputies, Lt Col Bernard "Ben" Harvey, made some comment like, 'We were really hitting all these spheres in parallel.' Warden explained they were looking for a label for what happened and "parallel" struck him as more descriptive and accurate to what had been done.[331]

By 1995, Warden had refined his ideas for how parallel war differed from "serial" warfare; with simultaneity a key aspect of it. While World War II bombing often hit multiple targets, it rarely did so at the same time. The simultaneous attack on both multiple targets and different types of target categories, heightened the bombing's impact.

> [Vital] targets tend to be small, very expensive, have few backups, and are hard to repair. If a significant percentage is struck in parallel, the damage becomes insuperable. Contrast parallel attack with serial attack in which only one or two targets come under attack in a given day (or longer). The enemy can alleviate the effects of serial attack by dispersal over time, by increasing the defenses of targets that are likely to be attacked, by concentrating his resources to repair damage to single targets, and by conducting counteroffensives. Parallel attack deprives him of the ability to respond effectively, and the greater the percentage of targets hit in a single blow, the more nearly impossible his response.[332]

[330] John A. Warden III, "Employing Air Power in the Twenty-first Century," in *The Future of Airpower in the Aftermath of the Gulf War*, Richard H. Shultz Jr. and Robert L. Pfaltzgraff Jr. eds. (Maxwell AFB, AL: Air University Press, 1992), 79.
[331] John A. Warden III, personal conversation (March 11, 2015).
[332] John A. Warden III, "The Enemy as a System." *Airpower Journal* 9 (Spring 1995), 55-56.

In his year 2000 epilogue to *The Air Campaign*, Warden connected parallel warfare to speed concepts reminiscent of Boyd's OODA loop. "The faster we can force the conversion, the more likely we are to succeed, for the slower we proceed and the more serially we approach the problem, the more likely it is that the enemy will find ways to counter our operations. Thus, our goal was to bring the Iraqi system under rapid—or parallel—attack."[333]

It is only in terms of the enemy as a system, parallel warfare, and the pursuit of strategic paralysis that one can grasp what Warden's team meant by the next element: leadership targeting. Parallel warfare overwhelms the enemy leader's decision-making ability and freezes or, paralyzes the individual (or group of individuals performing the leadership function of the enemy). The sudden assimilation of failure across every function of the military and society paralyzes the leader to such a degree that the individual is compelled to accept the ends sought by the state applying the air power. Warden terms the result "strategic conversion"; the leader has lost the will to resist, and surrender or a negotiated settlement must occur in the direction of the desired end state.

Warden notes that leadership targeting in and of itself is not new.[334] Any nation that lost its king or leader in battle experienced dislocation. Americans intentionally applied this concept at the Battle of Saratoga in 1778. American revolutionaries combined sniper fire with leadership targeting in a fate-altering breach of battle norms. Meeting General John Burgoyne at Freeman's Farm in Saratoga, New York, the proto-type of US Army Rangers Daniel Morgan waited with expert marksmen positioned high

[333] Warden, *The Air Campaign* (epilogue), 147.
[334] John A. Warden III, "Employing Air Power in the Twenty-first Century," in *The Future of Airpower in the Aftermath of the Gulf War*, Richard H. Shultz Jr. and Robert L. Pfaltzgraff Jr. eds. (Maxwell AFB, AL: Air University Press, 1992), 65.

in the trees. In an early rendition of "over, not through," the snipers deviated from European etiquette and took aim over the infantry to target British officers in the rear. British Sergeant Roger Lamb gave this account: "Men, and particularly officers, dropped every moment on either side of me. Several of the Americans placed themselves in high trees [and when they see a British officer's uniform they kill him] by deliberately aiming at his person."[335] One of these essential officers was Brigadier General Simon Frazier who fell mortally wounded.[336]

Thus, one could argue that leadership targeting is a part of general strategic theory, but as evidenced by the British surprise over this action at Saratoga, this practice was far from normal in 18th century warfare when Clausewitz was writing. Further, Sun Tzu speaks about defeating an enemy's strategy, but he does not make targeting a king or general its own "ring" in his model.[337] Applying leadership targeting to modern states, Warden's airpower approach was a new method that offered the prospect of quick and relatively easy victory (that airpower theorists had all championed in the past). Drone strikes on terrorist leaders are modern extensions of this distinctive airpower capability.

The fourth concept comprising Warden's theory of action was the "*effects-based*" rationality. An effects-based approach reminded leaders that airpower is not about the

[335] Roger Lamb, *A British Soldier's Story: Roger Lamb's Narrative of the American Revolution* (Baraboo, WI: Ballindalloch Press, 2004), 47.
[336] Ronald F. Kingsley, "Letters to Lord Polwarth from Sir Francis-Carr Clerke, Aide-de-Camp to General John Burgoyne," *New York History*, Vol. 79 Issue 4 (Oct 1998): p. 32. At the moment that General Frazier went down, Buygoyne's Aide-de-Camp Sir Francis Clerke rode up with a message to withdraw the artillery when the next sniper round took Clerke down too. The chaos was great and the victory rippled across the ocean where the French found the victory they needed to believe in the feasibility of American independence.
[337] Sun Tzu proposed a 4 Ring Model starting with the enemy strategy itself as the inner core, alliances second, fielded forces third, and the population or cities fourth. Interestingly, Douhet had his own 5 Ring Model that included industry, transport infrastructure, communications, government and the population or "the will of the people." See Sun Tzu, *The Art of War* (Oxford: Oxford University Press, 2005), 115-117.

bomb. Airpower is about what effect bombing can have on an enemy system; that in turn helps to achieve the desired political objective. This concept was an effort to abandon the mechanistic thinking demonstrated in Vietnam by equating sortie counts and bombing totals to success. "Effects-based rationality" flowed from the general notions like centers of gravity and a systems approach. As Warden noted in lessons learned from World War II, "Within [the overall view of the 5 Rings] one can begin to think about how to indentify centers of gravity and what must be done to the broad system to produce the effects that will enable the achievement of the stated political and military objectives. The result is what we conceive to be a top-down look at the problem."[338]

After the war, effects-based rationality matured into the framework called Effects-Based Operations (EBO). Then Lieutenant Colonel David Deptula knew that America's dazzling new means displayed in the Gulf War were useless if they failed to achieve the desired overall effect.[339] In short, his work asked, "Are the ways in which we employ our new means going to produce effects that lead to our political ends?" Accordingly, EBO are defined as, "coordinated sets of actions directed at shaping the behavior of friends, foes, and neutrals in peace, crisis, and war."[340] Colin Gray added that strategy should be about strategic effects on the course of events in question.[341] Without relying on an effects-based rationality, a strategy can result in "doing the job right" rather than "doing

[338] Warden, "The Enemy as a System," 41.
[339] David A. Deptula, "Firing for Effect: Change in the Nature of Warfare," in *Defense and Airpower Series*, ed. Aerospace Education Foundation (Arlington, VA: Aerospace Education Foundation, 1995).
[340] Edward A. Smith, "Effects Based Operations: Applying Network Centric Warfare in Peace, Crisis, and War.," in *Effects Based Operations*, ed. Command and Control Research Program (Washington DC: DoD, 2002), xiv.
[341] Gray, *Modern Strategy*, 18-19.

the *right* job."[342] In the final analysis, a strategy based on logic that does not tie to the desired end state is not just flawed, but also detrimental.[343]

EBO was tortured in the wake of the 9/11 wars. Books like *Fiasco* and *Tell Me How this Ends,* and documentaries like *Restrepo* all pointed to the DoD as an organization lacking a reliable strategic development framework. US Marine General James Mattis, on the eve of becoming the commander of Central Command, declared in 2010 that the search for a viable framework was active—and necessary. "By spending a lot of time up front getting [the problem] right, you don't invade a country pull the statue down and say, 'Now what do I do?'" [344]

In pursuing a strategy framework that would produce winning ideas at the start of military planning, General Mattis first directed the DoD away from EBO as a strategy development concept.[345] He viewed EBO as mechanistic and sensible only in "closed systems" but over-simplified for operations in "open systems" such as Iraq (discussed further in chapter 3). His direction was an ironic twist since EBO was specifically designed to move the Air Force away from mechanistic thinking. One year later General Mattis re-focused the DoD on what was once called "systemic operational design," then "operational design" and now simply, "design" (which remains the formal answer to his search for a framework).[346] However, the EBO concept has lived on in the JP 3-60[347] and

[342] Drew and Snow, *Making Twenty-First-Century Strategy: An Introduction to Modern National Security Processes and Problems*, 24.
[343] Mintzberg, *The Rise and Fall of Strategic Planning: Reconceiving Roles for Planning, Plans, Planners*, 360. As Mintzberg notes, one can plan a poor idea with loose logical connection to effects and be no better off.
[344] General James Mattis. Speech at the Center for a New American Security, (February 18, 2010).
[345] General James Mattis. Memo to Joint Forces Command (Aug 14, 2008).
[346] General James Mattis. Memo on a Vision for a Joint Approach to Operational Design (Oct 6, 2009).
[347] Joint Publication 3-60, *Targeting* (January 31, 2013). Effects-based terminology dominates the joint publication from the definition of targeting (vii), one of the four principles of targeting (viii), prominence in the Joint Targeting Cycle narratives (II4), and a section devoted to effects (II 33-36).

the Joint Warfare Analysis Center (JWAC) website. The JWAC commander at the time even asked General Mattis if he should strike the phrase "effects" from the JWAC mission statement.[348] The general allowed the term to remain.

Finally, the Enemy as a System theory of action illustrates how specific principles of war can suit its unique character and combine with notions taken from general theory. Warden's team added four important *precepts* that accommodated the Iraq war's changing character. First, target selections were designed to convey a specific message: the war was against the Hussein regime and not the Iraqi people. Second—and related to the first—American airmen would go to "extraordinary lengths" to minimize civilian casualties and collateral damage. Third, the strategic ways adopted to achieve the desired political objectives aimed to keep Allied and American casualties very low (which they achieved). Fourth, all operations envisioned from theory "would use the asymmetrical application of force."[349] These four precepts are examples of creativity that should result from analyzing the distinctive character of war and its context. In summary, Warden's Rings, parallel warfare, strategic paralysis, direct attack on leadership functions, and effects-based operations combined to form a powerful theory displayed in Instant Thunder.

Level 5: Ways in Operation Desert Storm

[348] Colonel Michael Orr, personal conversation, March 31, 2015. The JWAC mission statement includes "Provide combatant commands, Joint Staff, and other customers with effects-based analysis and precision targeting options for selected networks and nodes in order to carry out the national security and military strategies of the United States during peace, crisis, and war." http://www.jwac.mil (accessed April 8, 2015).

[349] John A. Warden III, "The Gulf War: How WWII Lessons Influenced Planning and Execution," in *From Total War to Total Victory*, Steven Weingartner, ed. (Wheaton, Illinois: Cantigny First Division Foundation, 2005), 278, 279.

This illustration of layered theory strongly influenced the ways selected to employ air power in the Gulf War--the blend of concepts and actions that yielded the strategy for using aerial means to help achieve political ends. The ways that guided the air campaign appeared in the draft Instant Thunder plan. Instant Thunder then became a centerpiece of Operation Desert Storm through a storied process. Like all concept innovations though, Instant Thunder had to survive a complex and onerous organizational process of vetting and ultimately, it did so.[350]

The targeting flowed as Warden's airmen envisioned: first, negate the IADS, kill the Iraqi Air Force on the ground, cut off Iraq's army in Kuwait, avoid destruction that would produce a power vacuum in the Middle East, and achieve the better state of peace they designed before the war. Within hours after the air campaign began, Saddam Hussein and his subordinates became blind (unable to track what was coming into Iraq), deaf (unable to receive communications), and mute (unable to give routine orders) due to degraded command and control capabilities and functions. Electricity went out. The destruction of more than fifty key bridges paralyzed the movement of supplies without destroying the roads. Air attacks eroded oil storage capability.[351] Bombing also helped keep Israel out of the war with the intense assaults on Scud missiles.

Yet planning adaptations occurred as they always do in war. The first transpired after Colin Powell reviewed Instant Thunder. The general approved the plan but added the need to destroy Iraq's army in Kuwait. Airpower helped to achieve that objective by

[350] See Richard T. Reynolds, *Heart of the Storm*, Maxwell AFB, AL: Air University Press, 1995. "The Exiles" from Warden's team were held behind by General Horner to continue detailed planning.
[351] Ben Lambeth, *The Transformation of American Air Power* (Ithaca, NY: Cornell University Press, 2000), 268. The Gulf War Air Power Study concluded that protracted effects from targeting POL in Desert Storm was insignificant in that case because unlike World War II, the Gulf War was too short to benefit from cumulative effects of fuel constriction.

combining with Allied ground power the Battle of Khafji, and by single-handedly mauling Iraqi vehicles retreating on the "Highway of Death." Air power enabled Khafji to become "the battle that didn't happen" as the massive amounts of systematic interdiction wrecked a large Iraqi ground force forming against Allied troops on the night of January 30, 1991.

> The senior officer in the TACC, Major Gen John Corder, swung JSTARS to the east and began diverting coalition fighters to engage moving ground targets in Kuwait. Upon being apprised of the Iraqi troop activity, Horner proceeded to the TACC and instantly saw an opportunity shaping up to engage the Iraqi column before it made contact with allied ground forces. Affirming the decision to divert coalition air power from its original tasking, he committed more than 140 aircraft against the advancing column, which consisted of the Iraqi 3rd Armored and 5th Mechanized Divisions. The ensuing air attacks continued throughout the night and well into the following day before the battle was over. As a result of the timely diversion of coalition fighters, the Iraqi forces never had a chance to mass and attack.[352]

A second adaptation required preventing Iraq from drawing Israel into the Gulf War. During the war, the Iraqis launched 83 Scuds. Of those, Iraq aimed 40 at Israel and those raids spurred widespread terror. It has been commonly assumed that Iraq hoped to provoke Israel to retaliate, a move that would likely splinter the Allied coalition by requiring Arab states to "ally" with Israel but Hussein denied this motive in 2004. In captivity, Hussein stated that in 1991 he believed the U.S. would stop the war if Israel was "hurt." He also wanted to punish Israel as the source of all Iraq's problems.[353] Yet the combination of Patriot missiles sent to Israel, along with numerous air and special operations missions to interdict the Scuds in the western desert of Iraq were effective enough to defend Israel. This overall design limited the Israeli deaths to four and the

[352] Lambeth, *The Transformation of American Air Power,* 121-122.
[353] FBI interviews, 3 March 2014, 3. *U.S. Declassified Documents Online*, accessed 20 Feb. 2016.

wounded to 289.[354] Moreover, the Scud hunting missions, while they accounted for 40% of all strike sorties in late January and destroyed zero mobile missile launchers, convinced the Israelis to stay out of the war.[355]

Orchestrating the dynamic aspects of the air campaign put a new premium on new air-to-ground command and control arrangements. As Ben Lambeth wrote,

> One need only consider the immensely difficult balancing act of getting 400 coalition fighters airborne and marshaled at night in radio silence, refueled (often several times), and working under tight time lines without a missed tanker connection, let alone a midair collision or other catastrophic accident, to appreciate how aircrew skill and the ability to adapt under stress were critically important to the air campaign's outcome. Without these and other intangibles, all the technology in the world would have been for naught.[356]

Yet far more important to the success of the Desert Storm air campaign was the interplay of the theory that had fostered it in concert with the situation encountered.

The coalition forces were fortunate that the character of war for Saddam Hussein's Iraq was a conventional conflict of relatively fast-paced movement. Multi-disciplinary theory, general strategic theory, and the strategic attack paradigm were all tailor-made for such an opponent. Additionally, Warden's theory of action, focused on the Enemy as a System and highlighting his 5-Ring Model, was also ideal for Iraq. Warden and his assistants carefully considered the applicability of theories comprising the first two levels of the Theory-to-Strategy Model, and they did the same to the paradigm and theory of action that were their own creations. As they did so, they came

[354] Richard A. Schwartz, *Encyclopedia of the Persian Gulf War* (Jefferson, North Carolina: McFarland & Company, Inc., Publishers, 1998), 149.
[355] Richard A. Schwartz, *Encyclopedia of the Persian Gulf War* (Jefferson, North Carolina: McFarland & Company, Inc., Publishers, 1998), 11. JSTARS was not applied to the problem until after the highway of death.
[356] Lambeth, *The Transformation of American Air Power*, 151-152.

to appreciate the "interconnectedness" that often appeared among the various levels of theory, and how that blending into a hypothesis could affect the suitability of the ways they ultimately selected to attack Iraq. Finally, they provided enough flexibility in their strategic design that they could accommodate modifications to it like the Scud hunt.

Analysis

In sum, the Upstream Model can explain how theory shaped the selection of ways for the air war in Desert Storm. There are four aspects of the theory-strategy nexus to highlight from this war. First, with hindsight from the unintended consequences of Operation Iraqi Freedom in 2003, the strategists' emphasis on winning without creating a power vacuum looks particularly wise now. They were so focused on this concept that they developed peace plans before the war was fought. This was pure multi-disciplinary strategy at work.

Second, Desert Storm had a general richness of theory at all levels of the model. John Warden and Dave Deptula were (and are) theoretically inclined and talented. This richness of theory resulted in an approach that was clever, unpredictable in its design, and effective. Further, the theory of action level is where maximum adaptation to the changing character of war seems to occur. Yet, in the case of Desert Storm even the paradigm level of theory was being shifted on the fly as strategists worked to solve the national problem. Strategists even intruded upon changes in general theory if one includes adaptations to the principles of war such as stealth for surprise and penetration for concentration.

Third, actors were "ways focused" in Desert Strom. From Schwartzkopf to Warden, strategists never let means *replace* ways even though they were managing an impressive suite of new capabilities that World War II theorists could only dream about. A really clear picture of the future of Iraq enabled this ways-focus. Most conflicts generate some narrative great or small about how endstates were unclear. Desert Storm strategists did not complain about unclear endstates from civilian leaders—they shaped them. The result was a cleaner problem decomposition that allowed the strategists to center on how—or the ways—to build a hypothesis on making that future picture come to pass.

Finally, Sun Tzu wrote that "all warfare is deception"[357] but there is another way to translate that principle. Roger T. Ames translation of the preceding passage discusses "shaping a strategic advantage (*shih*) from [the preceding concepts] to strengthen our position. By strategic advantage I mean making the most of favorable conditions and tiling the scales in our favor."[358] The Sun Tzu passage goes on about *creating paradox through ways* at every turn. This term "paradox" has a broader meaning than deception that includes cleverness. The trait of cleverness should, somehow, be the essence of strategy and the ultimate form of it, according to Sun Tzu, is figuring out how to win without fighting. The Desert Storm case suggests the skill of tailoring theory to the unique character of a war is somehow tantamount to this cleverness. It created strategic advantage through a creative approach that thrust paradox upon Iraq at every turn. In the end, Desert Storm is a case where a solid understanding of theory, a sound grasp of the

[357] Sun Tzu, "The Illustrated Art of War: The Definitive English Translation by Samuel B. Griffith" (Oxford, 2005), 96.
[358] Roger T. Ames, *Sun-tzu: The Art of Warfare* (New York: Ballantine books, 2010). See also the authors notes on "shih," page 71-83.

enemy, and a significant degree of ingenuity combined in pursuit of a finite political objective achievable in a finite amount of time.

CHAPTER 4
TRANSFORMING THEORY TO STRATEGY IN KOSOVO

Introduction

Theory in Operation Allied Force (OAF) ended up being very innovative because it had to be. Unlike World War II and Desert Storm, OAF was a limited war but paradoxically it had very high stakes. On one hand, it was limited war with several restrictions including no NATO ground forces. On the other hand, nothing short of NATO's credibility in post-Cold War era was on the line. In general theory, this conflict followed Thomas Schelling's "compellence" to get an opponent to stop actions underway but it took the form of coercive warfare. At the multi-disciplinary level of theory, diplomats were trying to strengthen liberal institutionalism through both NATO and the United Nations. The steady march of diplomacy throughout this war resembled the Alexander George's stages of coercive diplomacy even though this aspect of theory was tacit or unclear to many of the actors involved.

The air campaign was squarely in the strategic attack paradigm from Desert Storm. Only eight years removed from that war, there was a euphoric sense of what could be achieved through airpower. But Serbia would prove to be one of the most restrictive wars in our history and heavy restrictions did not favor the strategic attack paradigm. A special theory of action was desperately needed to reconcile the paradigm with the context. A long classified plan called Crony Attack was indeed created but not utilized until what was called, "The Strategic Campaign" that started two weeks into the

war. The context of this case study is fundamental to understanding the theory-strategy nexus in OAF.

The 1990s were the decade of humanitarian wars.[359] In four silent cases, humanitarian causes framed the reason for war. In Desert Storm the suffering of Kuwait under Saddam Hussein's forces was a factor. In 1994, America elected to fight in Somalia at the UN's request to restore order to the food relief disrupted by warlord Mohamed Farrah Aidid.[360] Between 1992-1995, 140,000[361] people were killed in Bosnia before Operation Deliberate Force helped lead to the Dayton Peace Accords and a 60,000-strong peacekeeping force. Then in 1998, the US began to plan for preventative action in Kosovo if ethnic cleansing spread into that region from Serbian leader Slobodan Milosevic—the "Butcher of the Balkans."[362]

The Kosovo crisis followed 10 years of US general reluctance to intervene in the Balkan civil war. US restraint stemmed from factors including: fear of the Vietnam Syndrome, perceived failure in Mogadishu, sizeable defense cuts in the 1990s (30-40%), Congressional opinion of minimal US interests in the Balkans, and President William Clinton's inherent foreign policy perspective.[363] When Serbian ethnic cleansing of Kosovar Albanians pushed American leaders past these restraints to intervention, the US

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[359] For a critical view of this trend see Conor Foley, *The Thin Blue Line: How Humanitarianism Went to War* (New York: Verso Books, 2008).
[360] United Nations in Somalia I (UNOSOM I) website, http://www.un.org/en/peacekeeping/missions/past/unosom1backgr2.html#five (accessed 27 February, 2016).
[361] International Committee of the Red Cross, "Missing Lives – Book and photo exhibition," https://www.icrc.org/eng/resources/documents/misc/missing-lives-060710.htm (accessed April 26, 2015). The exact death toll of the Bosnian War is obscure as approximately 2.2M people were displaced; 15,000 people are still unaccounted for; and mass graves continue to be discovered. Some estimates range above 200,000 killed.
[362] Adam Roberts, "NATO's 'Humanitarian War' Over Kosovo," *Survival*, vol. 41, no. 3 (Autumn 1999), 102-123.
[363] Dag Henriksen, *NATO's Gamble: Combining Diplomacy and Airpower in the Kosovo Crisis 1998-1999* (Annapolis, MD: Naval Institute Press, 2007), 64-88.

government was primed to receive a strategy founded on a limited-war theory consistent with limited US interests in Yugoslavia.

While humanitarian in origins, the war in Kosovo was not a minor one. Famously, this is the region where World War I began when a Serbian assassinated Archduke Franz Ferdinand in Sarajevo. Operation Allied Force (OAF) was the largest military operation over European soil since World War II.[364] During OAF, Russian President Boris Yeltsin's anger over NATO military action led to rhetoric insinuating the possibility of World War III over this perceived insult.[365] In the 78 days of incremental air war, 10,484 NATO aircraft flew strike sorties, dropping 20,000 plus bombs with 96.6% hitting their targets.[366] After the air war, a corps-sized peacekeeping force of 50,000 occupied Kosovo and became known as NATO's KFOR (Kosovo Force)—a peacekeeping presence still in Kosovo 17 years later. While some classify Kosovo "as a puny event,"[367] it was a sizeable operation with high stakes—preserving the integrity of NATO's collective security in the post-Cold War era[368] and halting ethnic cleansing. Nor was it easy. As Barry Posen concluded in his study of Kosovo, "Political and humanitarian goals turn out to be much more difficult to achieve than anyone expected. The opposition in these affairs is ruthless, resilient, and resourceful, and ought to be taken

[364] Karl F. Inderfurth and Loch K. Johnson, *Fateful Decisions: Inside the National Security Council* (New York: Oxford University Press, 2004), 253.
[365] Barry R. Posen, "The War for Kosovo: Serbia's Political Military Strategy" *International Security*, vol. 24, no. 4 (Spring, 2000), 66.
[366] PBS, Kosovo Facts, http://www.pbs.org/wgbh/pages/frontline/shows/kosovo/etc/facts.html (accessed April 27, 2015). The OAF sorties were 25% of ODS volume but 35% of the bombs were precision guided compared to 8% in ODS.
[367] Andrew J. Bacevich and Eliot A. Cohen, *War Over Kosovo: Politics and Strategy in a Global Age* (New York: Columbia University Press, 2001), xii.
[368] Benjamin S. Lambeth, *NATO's Air War for Kosovo: A Strategic and Operational Assessment* (Santa Monica, CA: RAND, 2001), xxi.

more seriously**."[369]** The State Department assessed Milosevic's potential for extremes as early as *1988* but now the watching was over.[370]

The main military effort in OAF was a 78-day air campaign from March 24-June 9, 1999.[371] On the eve of war, U.S. officials presented five political objectives to NATO ambassadors.[372]

1. a verifiable halt to ethnic cleansing and atrocities on the ground in Kosovo;
2. a withdrawal of all but a token number of Yugoslavian Army (VJ), Serbian Interior Ministry Police (MUP), and paramilitary troops from Kosovo;
3. the deployment of an international peacekeeping force in Kosovo;
4. the return of refugees and their unhindered access to aid; and
5. the laying of groundwork for a future settlement in Kosovo along the lines of the Rambouillet terms of reference.[373]

As often happens in war, different versions of those ends existed among the Allies. When President Clinton announced the war to the American people March 24, 1999—the opening night of bombing—he mentioned three ends:[374]

1. to demonstrate the seriousness of NATO's opposition to aggression,
2. to deter Milosevic from continuing and escalating his attacks on helpless civilians and,
3. to damage Serbia's capacity to wage war against Kosovo--as required--by seriously diminishing its military capabilities.

Nevertheless, even with both articulations of political goals, OAF somehow became editorialized as a war beginning without clear ends that "were not formulated until

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[369] Posen, "The War for Kosovo," 84.
[370] "Yugoslavia: The Serb Nationalism Question," (14 Aug 88), United States: Department of State, (14 Aug 88). U.S. Declassified Documents Online, (accessed 27 Feb 2016). This paper gauges the resurgence of Serb nationalism in Yugoslavia by the willingness of Slobodan Milosevic, party chief of the Serbian republic, to appeal to ethnic nationalism in an effort to achieve his political goals. The details of this paper contain insightful forecasts regarding the actual events of 1999.
[371] Lambeth, *NATO's Air War for Kosovo*, V.
[372] Lambeth, *NATO's Air War for Kosovo*, 10.
[373] For context on the Rambouillet terms see Eric Herring, "From Rambouillet to the Kosovo accords: NATO'S war against Serbia and its aftermath," *The International Journal of Human Rights*, 4:3-4 (2008), 224-245. The Rambouillet terms "required Serbia to accept a NATO-led 28,000-strong Kosovo Force (KFOR) to oversee the implementation process and be allowed to use force if necessary against any parties violating the agreement (Chapter 5, Article IV2b)."
[374] Lambeth, *NATO's Air War for Kosovo*, 13.

several weeks into the campaign."[375]

On June 9, 1999 Milosevic agreed to NATO's terms and began to remove Serb forces from Kosovo. One of the reasons he did so was how airpower was applied in a very restrictive geo-political context. Airpower's effectiveness to help achieve these desired ends passed through *many* filters. Ben Lambeth wrote, "airpower prevailed on its own despite the multiple drawbacks of a reluctant administration, a divided Congress, an indifferent public, a potentially fractious alliance, a determined opponent, and—not least—the absence of a credible NATO strategy surely testified that the air instrument has come a long way in recent years in its relative combat leverage…"[376] Limits to war are normal. Yet, when considering all of the limits imposed upon operations in Kosovo, it stands out as one of the most restricted conflicts in U.S. history.

Adding to Lambeth's list, the following constraints compounded the narrowness within which strategists worked: Solana declared that "we are not at war with Yugoslavia;"[377] rules of engagement were increasingly narrowed over time;[378] civilian leaders from 19 NATO nations vetoed on specific targets throughout the 78 days and daily targeting was subjected to such a process;[379] a Presidential declaration that no land troops would be used; internal Department of Defense resistance from Weinberger doctrine about using the military only for vital U.S. interests;[380] and as discussed later, the incremental nature of "try-and-see" and "turn-the-screw" coercive diplomacy. Altogether, Allied Force may be one of the most politically restricted military endeavors

[375] Henriksen, *NATO's Gamble*, 49.
[376] Lambeth, *NATO's Air War for Kosovo*, xxii.
[377] Bacevich and Cohen, *War Over Kosovo*, 54.
[378] Fenrick, William J. "Targeting and proportionality during the NATO bombing campaign against Yugoslavia." *European Journal of International Law* 12.3 (2001): 501.
[379] Lambeth, *NATO's Air War for Kosovo*, xviii, 29, 36, 48, 77, 103.
[380] Bacevich and Cohen, *War Over Kosovo*, 42-44, 54.

in U.S. history, which placed an even higher premium and finding a theory of action that would work in these narrows.

While reasonable people still disagree about the final impetus for victory and its dynamics, few think Milosevic would have stopped his "Operation Horseshoe"—his ethnic cleansing of Kosovar Albanian civilians—without military force.[381] For many reasons found in the theory at play, the use of force came primarily from the air while supported by a partisan ground force in the Kosovo Liberation Army (KLA).[382]

The influence of theory upon air strategy in Kosovo was strong, yet theory's impact was harder to trace than the Desert Storm example for three reasons: the content classification of documents related to the operation, the incremental nature of the applied coercive diplomacy, and the variance in strategic perspectives that guided OAF. First, despite the recent declassification of National Security Council documents, aspects of the military strategy in Kosovo still remain "properly mired in secrecy."[383] Second, despite the classification aspect, academic critiques burgeoned over the layers of "firsts" and intrigue around OAF. As a result, diverse opinions abound about the conduct and utility

[381] Daniel L. Byman and Matthew C. Waxman, "Kosovo and the Great Air Power Debate," *International Security* 24 (Spring 2000), 35-37.

[382] There is always a land component in U.S. operations to control facts on the ground. Allied Force was used by some authors to demonstrate what could be achieved without a land component but the KLA were, in fact, acting as a land component in OAF. The opening of Enduring Freedom in 2001--before the Taliban was formally added to Al Qaida as an object of the war under Bush Doctrine--was similar. U.S. irregular warriors were acting by, with, and through Northern Alliance fighters to comprise the land component early on in that conflict. Even in Operation Odyssey Dawn, coalition forces were attempting to work with Libyan partisans on the ground in the initial phases of what was deemed a humanitarian intervention. In short, there is no example of U.S. military operations were there is not land component—the only question is who is the land component, how big is that force, where are they, how well trained are they, how are they functioning in the strategy, etc.

[383] Col (ret) Julian H. Tolbert, "Crony Attack: Strategic Attack's Silver Bullet?" (School of Advanced Air and Spacepower Studies, Maxwell AL, 2006), 1. Tolbert was a Princeton aerospace engineering graduate, bomber pilot, and B-2 liaison officer to the Air Operations Center working directly for Lt Gen Short—the JFACC (Joint Forces Air Component Commander) running the air war. For more information see Rebecca Grant, *The B-2 Goes to War* (Arlington, VA: IRIS Press, 2001), 30, 31, 40.

of OAF in general, and the theory at play specifically. The third challenge in tracing the development of air theory in OAF is the shift in strategic perspectives in two distinct phases of the conflict. Ambassador Greg Schulte—serving at NATO then the NSC over the course of the war—aptly calls the first two weeks "The Initial Strategy." This phase was dominated by the short war assumptions and a diplomatic "try and see" approach to coercive diplomacy. The second phase Schulte calls "The Strategic Campaign" within which the Crony Attack theory of action took place.[384] Anonymous sources associated with the development of Crony Attack relayed the same distinction in phases without being promoted by questioning.[385] During the shift toward the strategic campaign, Clinton and Tony Blair coordinated efforts to ensure NATO support for a sustained air campaign and strategic moves like freezing Milosevic's offshore accounts and sanctions on Belgrade.[386]

What that "Strategic Campaign" would look like was not clear at the highest military and civilian leadership levels. As William Arkin notes, "In short, NATO began the war without having achieved any consensus on what the alliance would do if the hostilities extended beyond 48 hours. Although the very fact that it was a Phased" campaign implied the possibility of escalation, the alliance had postponed any decision

[384] Gregory L. Schulte, personal conversation, April 21, 2015.
[385] These two "hind-sight" phases should not be confused with the three actual phases in the initial OAF plan. As William Arkin and others note, "When Allied Force commenced, NATO had gone through more than 40 iterations of the air-campaign plan. The version actually initiated on March 24 included three combat phases. Phase I would establish air superiority over Kosovo and degrade command and control throughout Yugoslavia. Phase 2 would attack military targets in Kosovo and those Yugoslav forces providing reinforcement into Kosovo... Phase 3 would expand air operations against a wide range of military and security-force targets throughout Yugoslavia, including the capital city Belgrade. If Phase 1 did not force the Serbian leadership to accede, Phase 2 and 3 would up the ante" (in Bacevich and Cohen, *War Over Kosovo*, 15). Thus, Shulte's "Strategic Campaign" mirrors the ambition in the original Phase 2 and 3 plan but it took the form of Crony Attack and strategic information operations.
[386] "Informal Working Meeting with British Prime Minister Blair," United States: White House Memo, 21 Apr 2016 (*U.S. Declassified Documents Online*, accessed 27 Feb. 2016), 1-2.

on what that escalation would entail."[387] This inter-phase confusion is important for tracing the intellectual history of Crony Attack.

Given these challenges for research, the Crony Attack theory of action in Allied Force is an excellent case for the role of theory in selecting ways. First, the narrowness of the political context forced maximum creativity upon the strategists involved. When means (in this case constrained) are insufficient for ends the difference must be accounted for by ways. Second, Crony Attack demonstrates what is possible in the realm of theory in the most restrictive of contexts. If tailoring theory is driven by necessity like Crony Attack in Kosovo, then it can also serve as an inspiration for what is possible in the realm of theory when means are not limited or politics, less constraining. Finally, a closer look at the intellectual history of Allied Force shows that the role of theory in selecting successful ways in strategy can indeed be established.

Figure 10 offers a concept map illustrating the relevant theory that guided the air strategy for OAF. As ODS originated from its unique theory of action—Enemy as A System—the name of the OAF model stems from a key innovation called "Crony Attack." All four levels of theory combined to provide logic for air strategy.

[387] Bacevich and Cohen, *War Over Kosovo*, 5.

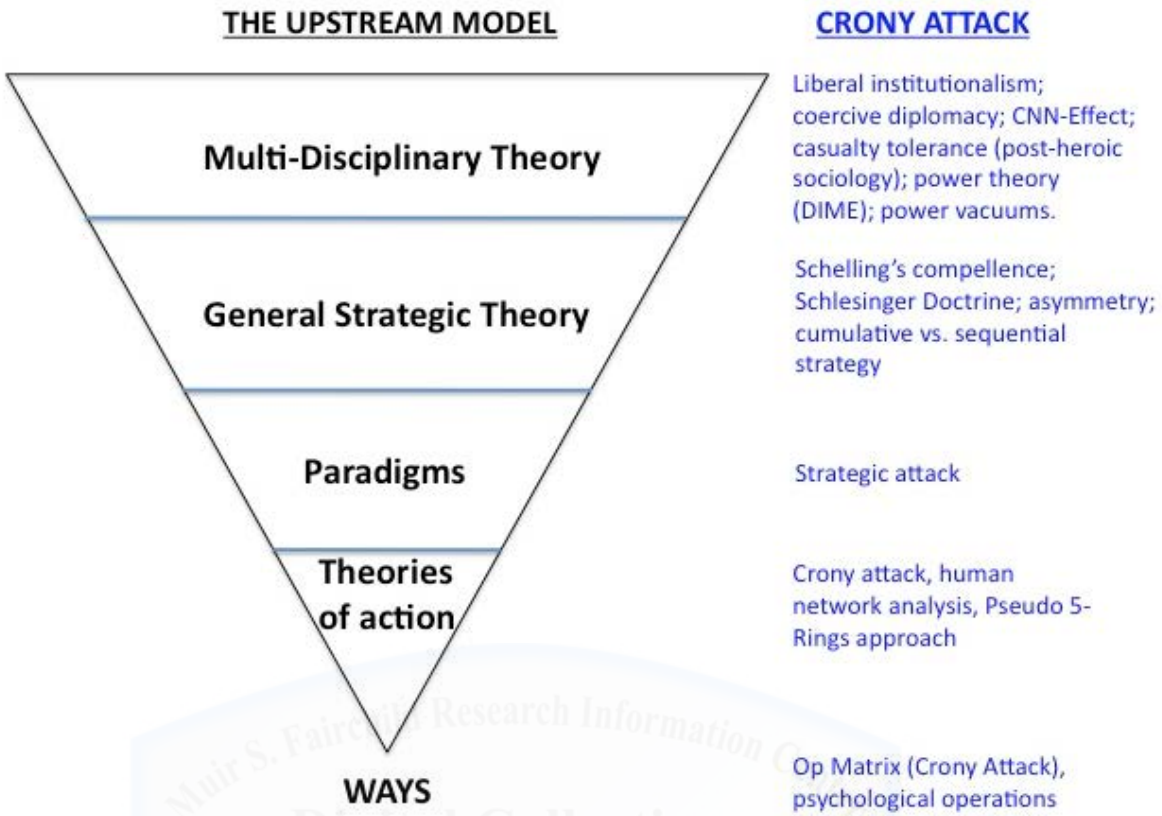

Figure 11: The Upstream Model for Crony Attack

Level 1: Multi-Disciplinary Theory

Unlike World War II and the Gulf War, the State Department never fully relinquished leadership of the strategy in Kosovo to the Department of Defense (DoD). In World War II and Desert Storm, diplomacy provided a backdrop while military action took over as the primary instrument of compelling an enemy to do American will. As such, DoD became the "supported" department with State continuously "supporting" the strategy. In OAF, the roles were reversed. State was the "supported" department and DoD was the "supporting" department. When the try-and-see phase of coercive war

began, Madeline Albright signaled a shift in her press conference on March 25, 1999. "… We have moved from diplomacy backed by the threat of force to the use of force backed by diplomacy."[388] For reasons explored here further, the reality was slightly different. Since Allied Force was coercive warfare rather than a declared one, the State Department and NSC maintained *de facto* control of the coercive operation as it shifted from a try-and-see approach in the first two weeks to a turn-the-screw form of coercive warfare when Crony Attack began. In effect, OAF was *diplomacy* backed by *use* of force and that is certainly how the arrangement was being received in the field.[389] Thus, a collection of thoughtful officers in the bowels of the Pentagon did not drive strategy-making as they had during Desert Storm. This difference is key to understanding the theory-to-strategy process for OAF.

June 19, 1998 was a pleasant Friday evening in Washington DC as workers pressed through traffic to get home for the weekend. At the box office, "Armageddon" starring Bruce Willis, Billy Bob Thornton, and Ben Affleck was the most popular movie. In sports, Michael Jordan's Bulls were on the front cover of *Sports Illustrated* after winning their second consecutive NBA Championship. At the White House, the President sat down at 6:00pm with his Security Council staff to deliberate about the Kosovo crisis. A declassified "Summary of Conclusions" from that meeting included agreement on the importance of *liberal institutional theory*.

The President tasked State to emphasize NATO's role by "consultations with key allies, especially UK and France, with view to establishing a legal basis for possible

[388] Madeline Albright, "Press Conference on Kosovo," Washington, DC (March 25, 1999), (accessed May 20, 2015).
[389] Clark, *Waging Modern War*, 364.

NATO action in Kosovo not requiring UN authorization."[390] Russia, acting as a "big brother" to Serbia, had deep historical ties there. Serbia was faithful to Russia through the World Wars and paid the price for its devotion in both conflicts. As such, no one really expected Russia to approve action in Serbia via the United Nations Security Council. Clinton and his advisors wanted to advance the integrity of NATO in a post-Cold War world, and Kosovo seemed like an ideal spot to achieve a win-win: stop genocide and strengthen NATO. The NSC emphasis on NATO unity was consistent with liberal institutional theory. However, evidence indicated the role of liberal institutionalism was tacit in this case—an unstated theory that, in part, explains the logic of supporting NATO.

Robert O. Keohane has written how liberal institutions--like NATO--are central to a better state of peace. International institutions influence calculations of self-interest. They can also help overcome "political market failures" that stem from irresponsibility, moral hazards, externalities, and incomplete information. International regimes like NATO "establish mutual expectations about others' patterns of behavior and to develop working relationships that will allow the parties to adapt their practices to new situations."[391]

Greg Schulte had a unique perspective on the US view of NATO in 1998. From 1992-1998 he worked on the NATO International Staff in numerous positions: first as Director, Nuclear Planning; then Director, Bosnia Task Force; and Director, Crisis

[390] Adobe Acrobat Document, "Declassified Documents concerning National Security Council (NSC)," *Clinton Digital Library*, http://clinton.presidentiallibraries.us/items/show/16197 (accessed May 1, 2015), 10 (of 200).
[391] Robert O. Keohane, *After Hegemony: Cooperation and Discord in the World Political Economy* (Princeton: Princeton University Press, 2005), 85-97.

Management and Operations. The later position led Schulte into a Kosovo advisor role with Secretary General Javier Solana, chairing NATO meetings that prepared political guidance for possible air strikes. NATO credibility was seemingly on the line and Milosevic believed that NATO was not prepared to act. As Solana told Schulte, Milosevic figured out how to ensure NATO stayed away. In Milosovic's mind, he just needed to avoid very large massacres; thus, "A village a day keeps NATO away."[392]

Schulte transferred to the NSC as Special Assistant to the President from July 1998-July 1999, covering the window of strategy development for OAF. Schulte had a Warden-like role in OAF but as a civilian. In his view, maintaining consistency in NATO's approach and holding the Alliance together were key concerns. NATO unity was the Alliance's center of gravity.[393] Following a July 15, 1998 NSC meeting, DoD began planning a limited air campaign expressly to bolster NATO's credibility. [394] This liberal institutional priority of strengthening NATO can be found throughout the NSC deliberations like these opening words summarizing an August 6, 1998 meeting. "Principals agreed that it is essential to re-establish the credibility of a possible use of force by NATO."[395]

Coercive diplomacy was a second aspect of multi-disciplinary theory guiding OAF. Coercive diplomacy frames the air war in Kosovo, yet there are two different

[392] Gregory L. Schulte, personal conversation, April 21, 2015.
[393] Gregory L. Schulte, email correspondence, April 22, 2015.
[394] Adobe Acrobat Document, "Declassified Documents concerning National Security Council (NSC)," *Clinton Digital Library*, accessed, http://clinton.presidentiallibraries.us/items/show/16197 (April 29, 2015), 20 (of 200). "Principals agreed to continue accelerated NATO planning for a full range of contingencies. *In order to enhance the credibility of possible NATO action* in Kosovo, Principals agreed to consider stand-off air options that might be employed before--and at lower political threshold than--a full air campaign" (italics and hyphenation added).
[395] Adobe Acrobat Document, "Declassified Documents concerning National Security Council (NSC)," *Clinton Digital Library*, accessed, http://clinton.presidentiallibraries.us/items/show/16197 (April 29, 2015), 21 (of 200).

kinds of coercion theory: the coercive diplomacy of Alexander George and the military coercion of Thomas Schelling. Many in State acted in concert with George's theory, while most in DoD acted in concert with Schelling, and confusion resulted.

The differences between the two theories were significant. Alexander George distinguished "coercive diplomacy" from Schelling's "compellence." For Schelling, compellence was one of two forms of coercion (the other was deterrence), and both compellence and deterrence fit into the category of "general strategic theory" in The Upstream Model (see Attachment 3, Thomas Schelling's Two Kinds of Coercion). In contrast, George's coercive diplomacy from international relations theory fits under the multi-disciplinary theory category. George distinguished coercive diplomacy from compellence in two ways. First, he emphasized more than Schelling that coercive diplomacy can include positive inducements and accommodation (carrots) as well as coercive threats (sticks). This distinction led to a literature on how incorporating assurances could influence strategies. Second, "George differentiated between defensive and offensive uses of coercive threats." He defined coercive diplomacy as a "defensive strategy that is employed to deal with the efforts of an adversary to change a status quo situation in his own favor." The defensive strategy boiled down to persuading an adversary like Milosevic to stop what he was doing or to undo what he had done.[396] Presumably, George's offensive uses of coercive threats takes one into what Schelling called Coercive Warfare which fits OAF very nicely.

[396] Jack S. Levy, "Deterrence and Coercive Diplomacy: The Contributions of Alexander George," *Political Psychology*, Vol. 29, No. 4, (2008), 539-540. Levy was a student of Alexander George. This work is an interpretive guide to George's main ideas about coercive diplomacy.

George outlined four stages of coercive diplomacy. The conflict—knowingly or unknowingly—tracked perfectly according to these stages. In an underappreciated sense, these stages were the essence of flexibility in this strategy.[397]

1. *Try-and-see* - a demand is made without an explicit threat or time limit
2. *Gradual turning of the screw* - the threat of an incremental rather than step-level increase in coercive pressure
3. *Tacit ultimatum* - strategy involves an implicit rather than explicit form of any of the ultimatum elements
4. *Ultimatum* - a demand, with a time limit for compliance, and potent and credible threat of punishment for noncompliance

In each case, the theory of coercive diplomacy inherently involved gradual steps in one form or another. However, many critics did not view the ways chosen to guide OAF strategy from that perspective. Edward Luttwak called OAF slow and torturous.[398] Barry Posen called the incremental nature of OAF "our squeamishness."[399] Ben Lambeth characterized OAF as disturbing like Rolling Thunder in Vietnam and branded the operation with "gradualism."[400] Dag Henriksen noted how the Powell Doctrine was violated by not seeking decisive defeat.[401] Andrew Bacevich and Elliot Cohen call OAF a "strange little war," "a puny event" compared to World War and "small beer" for the military historian.[402] Michael O' Hanlon titled his work on Kosovo, "Winning Ugly."[403]

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[397] Levy, "Deterrence and Coercive Diplomacy," 540. Levy notes that George, like Schelling, emphasized that coercive diplomacy is highly context-dependent. Its effectiveness is a function of the type of provocation, the magnitude and depth of the conflict of interests, actors' images of the destructiveness of war, the degree of time urgency, the presence or absence of allies on either side, the strength and effectiveness of leadership, and the desired post-crisis relationship with the adversary. On the basis of a number of case studies, George concluded that the primary factors favoring the success of coercive diplomacy are an asymmetry of motivation favoring the coercing state, a sense of time urgency on the part of the target, and the target's fear of unacceptable escalation.
[398] Luttwak, Strategy, 76.
[399] Posen, "The War for Kosovo," 56.
[400] Lambeth, *NATO's Air War for Kosovo,* 29, 234.
[401] Henriksen, *NATO's Gamble,* 73.
[402] Bacevich and Cohen, *War Over Kosovo,* ix, xii, 9.
[403] Ivo H. Daaler and Michael E. O'Hanlon. *Winning ugly: NATO's war to save Kosovo*. Brookings Institution Press, 2004.

These perspectives miss the essence of the theory. Gradualism was the foundation of coercive diplomacy and significantly shaped the selection of ways for OAF strategy.

Three examples illustrate how coercive diplomacy theory shaped OAF strategy. First, American air planners proposed four possible reactions that Milosevic might have to coercion. A White House "senior official" characterized these paths:[404]

1. The whiff of gunpowder in theater will make Milosevic back down.
2. Milosevic must take some actual hit to justify acquiescing.
3. Milosevic is a playground bully who will fight back but back off after a punch in the nose.
4. Milosevic will react like Saddam Hussein and the conflict will last longer.

The official said to the *Washington Post*, "on any given day, people would pick one or the other [as a possible scenario]. We thought that the Saddam Hussein option was always the least likely, but we knew it was out there, and now we're looking at it."[405] Like sound economists who can differ as bulls or bears upon reading the same economic data--reasonable people disagreed about what it would take for compellence to work in Kosovo. Richard Holbrooke was bullish on Milosevic conceding quickly and this became the "official future." The short-war assumption has been heavily critiqued as a failure.[406] On the other hand, assumptions about how an adversary will react routinely cloud the strategic landscape. Strategy is always a guess.

A second example of coercive diplomacy's influence came from the NSC. Classic code words for coercive diplomacy—carrots and sticks—appeared in the classified NSC "Summary of Conclusion" as early as June 19, 1998:[407]

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[404] Rebecca Grant "The Kosovo Campaign: Aerospace Power Made it Work (Arlington VA: The Air Force Association, 1999), 8.
[405] Thomas W. Lippman, "State Department Miscalculated on Kosovo," *Washington Pos*t (April 7, 1999).
[406] See for example Lambeth, *NATO's Air War for Kosovo*, 182-184.
[407] Adobe Acrobat Document, "Declassified Documents concerning National Security Council (NSC)," *Clinton Digital Library*, accessed, http://clinton.presidentiallibraries.us/items/show/16197 (April 29, 2015), 8-9 (of 200). Emphasis on "carrots and sticks" is original from the NSC summary.

> Facing the parties with a full range of incentives and disincentives to encourage them to accept the package of principles as the basis for a negotiated resolution, notionally including:
> For Milosevic --*sticks:* a full range of punitive measures not limited to continued and additional international sanctions --*carrots:* phased lifting of sanctions and normalization of international relations linked to implementation of the agreement;
> For Kosovars --*sticks:* no protection from proportionate (Former Republic of Yugoslavia) FRY/Serbian response to violent provocations, disruption of [Albanian] UCK financing and logistics, lifting of UNSCR 1160 to permit re-supply of FRY/Serbia weapons --*carrots:* a place at the table for political representatives of UCK.

As the road to air war unfolded month-by-month, the NSC looked for options to turn the screws on Milosevic. By October 24, 1998 the NSC concluded "FRY compliance with UNSCR 1199 remains insufficient… To achieve further progress toward compliance, additional pressure should be brought to bear on Milosevic." The additional pressure included "reconceptualizing" an expanded air campaign.[408]

The third mark of coercive diplomacy was the language used to describe the air campaign by diplomats and principals. In June 1998, the conceptualization of a military dimension to the diplomacy was simply called "an air campaign." In July, this term changed to "standoff air options." By September the labels were "the Limited Air Option" or "phased air campaign." In October, the military aspect of coercion was also called the "Limited Air Response."[409] As inferred from these names, the notion of gradualism shaped the terminology of the military effort throughout the planning stage, and indeed, that concept provided the focus of the air campaign once bombing began. Observed Luttwak:

> Of course if one theory fails after much bombardment, another can be tried. For

[408] Adobe Acrobat Document, "Declassified Documents concerning National Security Council (NSC)," *Clinton Digital Library*, accessed, http://clinton.presidentiallibraries.us/items/show/16197 (April 29, 2015), 32-33 (of 200).
[409] "Declassified Documents concerning National Security Council (NSC)," 17, 20, 26, 33 (of 200).

> example when the 1999 Kosovo war started on March 24, initially the bombing was mostly symbolic and largely aimed at air defenses, on the theory that the government of Slobodan Milosevic only needed to be convinced of NATO's determination to capitulate. When that failed to happen, in April the bombing became distinctly heavier and focused on weapons factories, depots, bases, and barracks, on the theory that Serbian military leaders would pressure the government to accept the abandonment of Kosovo in order to save their remaining institutional assets. By May 1999, however, civilian infrastructures such as power stations and bridges were being destroyed to make everyday life as difficult as possible on the different theory that the Milosevic government was not undemocratic after all, that it would respond to pressures for surrender from an increasingly uncomfortable public.[410]

Fourth, the war progressed through all four of George's coercive diplomacy stages if one can accept the first two stages were of "the defensive type" and the second two stages were "offensive" forms of compellence.[411] Tacit ultimatums were issued by the U.S. State Department when news of ethnic cleansing reached Washington. At first, Milosevic could not know where the red lines were with the U.S.—he had to guess because they were tacit. Then, Richard Holbroke's ultimatums were delivered including an in-person visit to Milosevic right before the war began (discussed further in this chapter). Then as Luttwak noted above, an offensive form of "try-and-see" warfare began thinking capitulation would happen soon after. Finally, Crony Attack during the "strategic campaign" perfectly modeled an offensive form of "turn-the-screw" stage.

The combination of coercive diplomacy's gradualism with the idealistic emphasis of liberal institutionalism created dissonance among many officers during the air campaign. First, Vietnam tainted the notion of gradualism. Any military actions that

[410] Luttwak, *Strategy*, 77 (emphasis added).
[411] Alexander George's work focused on the four "defensive" forms of compellence: try and see, turn the screw, tacit ultimatum, and ultimatum. Once Holbrooke left Serbia for the final time, the coalition stepped through the same basic progression but in an offensive form (try and see with bombing, turn the screw with bombing). George simply ascribes offensive forms to the realm of "blackmail." George acknowledges that viewing defensive and offensive forms of compellence together is more suited to how Schelling wrote about this subject. See *Forceful Persuasion*, pg. 5.

gave an appearance of incremental bombing in slowly unfolding phases were auto-branded as a bad approach. Just as most military commanders in Desert Storm had fought in Vietnam, so too had those of Allied Force, including: CJCS, General Hugh Shelton, USA; Supreme Allied Commander for Europe, General Wesley K. Clark, USA; and the OAF JFACC, Lt General Michael C. Short, USAF.[412] Once military operations began, those individuals likely had difficulty seeing an operation founded on the coercive theory of Alexander George in a positive light.

Second, the value placed on NATO, which dictated that all participants would play a role in overseeing the air effort, compounded the gradualism by adding layers of multi-nation coordination. Thus, to many observers of OAF, the operation appeared to shift gears haphazardly and drag on longer than projected. However, "shifting gears" and "dragging on" is inherent to both coercive diplomacy and liberal institutionalism, and was a natural—and effective—result of that theory combination.

A third aspect of multi-disciplinary theory appears in the President's decision to *prohibit "troops on the ground*."[413] This development had nothing to do with level 2 strategic theory; instead, the political decision shaped by multi-disciplinary theory set the parameters for which aspects of general strategic theory (level 2) would be applied. Within the mandate of no boots on the ground, military theory was narrowed but as further research shows, this did not curtail the ability to find a theory of victory for Kosovo. One impact of the decision was the "CNN Effect." Writing in 1997, Steven Livingston noted the CNN Effect was novel due to the "global, real-time quality to

[412] Henriksen, *NATO's Gamble,* 37. On page 35, Henriksen also lists the ODS leaders who were also in Vietnam.
[413] Washington Post, "Clinton's Statements on Kosovo (1 Jun 99), http://www.washingtonpost.com/wp-srv/politics/daily/april99/clintonquotes.htm (accessed 27 Feb 16).

contemporary media that separates the 'CNN effect' from earlier media effects on foreign policy."[414] This concept grew during the Gulf War when visions of "the highway of death" attack on retreating Iraqi forces in Kuwait, and scenes of civilian carnage inside the wrecked Al Firdos bunker in Baghdad, shocked the American public. The military adapted soon afterward. "During the Gulf war, fear of an unsanitized presentation of the carnage of battle was perhaps central to the military's efforts to control the media through the use of press pools and military escorts."[415] While the influence of CNN-Effect on decision makers is often tacit, it was a phenomenon that grew in the 1990s and helped assure that the ground option was truly kept "off the table."

Barry Posen, in his analysis of the Kosovo War, describes why Milosevic could exploit America's desire for "extreme-casualty avoidance."[416] Edward N. Luttwak sees this fear as a norm common to the democratic base of a post-industrial society: the "post-heroic" era. "On March 24, 1999, when [NATO] started bombing [Yugoslavia] to force evacuation from Kosovo, the world witnessed the beginning of the first war conducted under post-heroic rules: no casualties for the fighting forces… and no deliberate attacks on enemy populations."[417]

The strategic logic behind the President's much maligned restriction was premised on no less than five other factors beyond the CNN-Effect and post-heroic norms. For one, American leaders deemed that US interests in Yugoslavia were very important, not vital to national survival. OAF was a war of choice. Further, committing

[414] Seven Livingston, "Clarifying the CNN Effect: An Examination of Media Effects According to Type of Military Intervention," Harvard University John F. Kennedy School of Government, Research Paper R-18 June 1997, 1.
[415] Livingston, "Clarifying the CNN Effect," 4.
[416] Posen, "The War for Kosovo," 62.
[417] Edward N. Luttwak, *Strategy: The Logic of War and Peace* (Cambridge, MA: The Belknap Press of Harvard University Press, 2001), 76.

US ground forces undercut the liberal goal of holding NATO together. Ground forces may have coerced Milosevic sooner but would have likely broken apart the Alliance since many NATO nations would not support a ground option.[418] Ben Lambeth notes two more reasons for the avowed policy of no troops on the ground: NATO logistics difficulties and the Clinton administration's concern over Congressional support for putting troops in harm's way without vital interests in Kosovo. Finally, on the heels of Operation Deliberate Force in Bosnia, the President needed to assure the American people that he would not allow a Vietnam-styled quagmire in the Balkans—and the length of the civil war there began to beg that question.[419] These reasons underscored the President's much-critiqued troop-prohibition that came out while announcing the air campaign to the American people on March 24, 1999.[420]

While alliance and domestic concerns prevented President Clinton from applying ground power, his economic and information programs gave him a measure of flexibility with the non-military elements of the DIME.[421] America optimized the *power theory* of the DIME model in a unique combination. OAF took place in a period of relative austerity. Four men embarked on a bold venture to reverse the macroeconomic fundamentals of the American economy: President Clinton, Federal Reserve Chairman Alan Greenspan, Speaker of the House Newt Gingrich, and Robert Rubin, director of the newly created National Economic Council. Together, these four leaders spurred reforms that led to four straight years of balanced budgets and declining structural debt. The debt

[418] Gregory L. Schulte, personal conversation, April 21, 2015.
[419] Henriksen, *NATO's Gamble*, 82. The author notes reluctance in the Pentagon to place U.S. troops on the ground for fears of mission creep in the Balkans.
[420] In context, the President was going through an impeachment process. Thus, he was weakened domestically and has less leverage to overcome any Congressional and public concerns about committing ground forces to Kosovo.
[421] "DIME" equates to the diplomatic, informational, military, and economic instruments of power.

went so low, Alan Greenspan commissioned studies to determine how to control the supply of money in the economy ("M1, M2, M3") if there were no debt instruments to manage supply via the Open Markets Committee.[422] In this context, defense spending also constricted 21%.[423] The austerity influenced American strategists to truly optimize the full range of power.

At the NSC, Greg Schulte helped guide interagency efforts to develop a DIME approach. He contributed to the strategic logic for political-military plans before the war and "the strategic campaign" a few weeks into the war after it became apparent that the short-war assumption was incorrect. The strategic campaign pulled all instruments of power together in document briefed to the President called "The Strategic Campaign Plan" that guided planning for the US/NATO air campaign in concert with non-military instruments of power.[424] A wider range of power sources began to act in concert. From the diplomatic perspective, State worked with European leaders to isolate Milosevic, which resulted in an international war crimes tribunal and UN resolution backing NATO's actions. Diplomacy also meant constant engagement with Russia, which was obviously concerned over the crisis affecting its client state. Informationally, NATO highlighted its resolve and Serbian atrocities through media outlets. NATO-further synchronized classified information operations with military operations to maximum effect. Militarily, the campaign shifted from attacking John Warden's "5th ring" of fielded Serbian forces to more strategic targets to urban targets in Serbia proper. And

[422] Alan Greenspan, *The Age of Turbulence: Adventures in a New World* (New York: Penguin Books, 2007), 154-188.
[423] Center for Defense Information, "Defense Budgets," http://www.pogo.org/our-work/straus-military-reform-project/defense-budget/, (accessed April 29, 2015). DoD spending in 1992 was 379.5B; in 1999, 298.4B.
[424] This document was not declassified along with recently declassified Kosovo papers in the Clinton Library.

economically, a combination of sanctions on Milosevic supporters and humanitarian aide to surrounding countries to stymie the Kosovar refugee crisis (Operation Shining Hope) went into effect.[425]

Finally, like in Desert Storm, American and NATO decision-makers worked hard to prevent a *power vacuum* from forming in the unstable Balkans. After the death of Marshal Josip Broz Tito in 1980, Yugoslavia had fallen into a prolonged period of violent revolutionary struggles for power and territory, and many of those struggles remained unresolved at the time of OAF.[426] In fact, the conflict in Kosovo in 1998 fit the classic definition of civil war: "armed combat within the boundaries of a recognized sovereign entity between parties subject to a common authority at the outset of the hostilities."[427] As such, Clinton and NATO leaders worked hard to avoid creating a power vacuum anywhere in the Balkans. Nearly a year before OAF, the NSC discussed the importance of this concept:

> Principals agreed to continue accelerated NATO contingency planning; in that context, an assessment should be prepared, immediately considering possible trigger or thresholds for NATO action, as well as what force might accomplish the mission *without creating a destabilizing one-sided military vacuum*.[428]

Civil wars are an ultimate expression of self-determination. The U.S. principals understood this and cautioned about going into the situation too heavily to include over-empowering *the KLA* in Kosovo. This logic represented balanced sophistication by limiting the power of the very ground force for whom the U.S. and NATO partners fought.

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[425] Gregory L. Schulte, "Revisiting NATO's Kosovo Air War: Strategic Lessons for an Era of Austerity," *Joint Forces Quarterly*, issue 71 (4th Quarter 2013), 16-17.
[426] Lambeth, *NATO's Air War for Kosovo*, 6.
[427] Stathis H. Kalyvas, *The Logic of Violence in Civil War* (New York: Cambridge University Press, 17).
[428] "Declassified Documents concerning National Security Council (NSC)," 10 (of 200).

Level 2: General Strategic Theory

Unlike coercive diplomacy, whose merits OAF planners considered in analyzing "multi-disciplinary theory," *deterrence and compellence* received consideration as an aspect of "general strategic theory." Thomas Schelling's *Arms and Influence* is the classic work explaining the difference between deterring and compelling. A product of the Cold War, Schelling tried to determine the situation when each notion would work best. Both concepts aimed to coerce an opponent, and both depended on credible force and messaging. However, deterrence and compellence differed in the goals sought and the methods for achieving them (see Attachment 2: Two Kinds of Coercion). Both concepts focused on the "idiom of military action" to achieve a desired change in an opponent's behavior. As such, using kinetic air power for 78 days to compel Milosevic to halt ethnic cleansing was a way of conducting *coercive warfare*-- a protracted form of compellence in Schelling's version of coercion. In coercive warfare one fought not to defeat a military, but rather to inflict damage that would cause the military's political chief to stop an on-going behavior.[429]

Coercive warfare is not nearly the only form that compellence takes. During the Cuban Missile Crisis, President John Kennedy chose a naval blockade to compel Nikita Khrushchev to change his on-going behavior of placing nuclear missiles in Cuba. The Cuban Missile Crisis illustrated how coercive warfare did not aim to defeat an enemy, but instead to compel the opponent to stop an offending action. Coercive diplomacy and coercive warfare are partner theories, but that connection was far from well established

[429] Thomas C. Schelling, *Arms and Influence* (New Haven, CT: Yale University Press, 1966), 77. Coercive warfare is discussed in the context of applying military power.

when OAF was being fought.

For compellence and its derivation, coercive warfare, to succeed, an incremental application of force is typically necessary, much like coercive diplomacy. Yet for many of the principals involved in executing OAF, the gradualism deemed essential by theory provided only frustration. US National Security Advisor Sandy Berger; the Chairman of the NATO's Military Committee (who led the military representatives to NATO) German General Klaus Naumann; and US Air Force Lieutenant General Michael Short, the JFACC for OAF, all had serious reservations about the incremental nature of the air campaign.

Frustration began mounting in early April when the short war assumption started falling apart. After little more than a week of bombing, National Security Advisor Berger called Schulte in the NSC to ask where the air campaign was going. Schulte and Berger agreed on the need to "bear with it" but quickly their dialogue shifted to bear with "what"? Tacitly, the ultimatum phase and short war hopes moved into a gradual turning-of-the-screw approach in "the strategic campaign" phase.[430]

In NATO, Naumann's thoughts resembled Berger's in Washington. As Chairman of the NATO military committee, Naumann oversaw Allied military chiefs. In early April, NATO ambassadors debated past midnight in an intense eight-hour meeting about whether they should expand the target list. Lambeth notes, "General Naumann insisted at that session that it was time to start 'attacking both ends of the snake by hitting the head and cutting off the tail.' His use of that bellicose-sounding metaphor reportedly infuriated the Greek and Italian representatives, who had been calling for an

[430] Gregory L. Schulte, personal conversation, April 21, 2015.

Easter bombing pause in the hope that it might lead to negotiations."[431] Naumann was not alone in his mindset to defeat the Serbian military.

During this first phase of OAF, Short was not happy with the air strategy, deeming it too much like Vietnam. He turned to his B-2 bomber liaison—Maj Julien Tolbert--in the CAOC[432] saying, "I'd like to know if the B-2 can fly every night to put pressure on Milosevic every night."[433] Focusing on Milosevic would have been consistent with the "strategic phase" of OAF. But it was taking too long to get to a more strategic-attack styled campaign. After the war, Lambeth captured how "Short later declined even to give Allied Force the courtesy of calling it a 'campaign,' saying that it was not an operation aimed at achieving clear-cut strategy goals with dispatch, but rather something more in the nature of 'random bombing of military targets…" Short's preference was to "go after the head of the snake."[434] His notion of leadership targets in Belgrade would have complied with John Warden's 5-Rings Model. Short was not alone. Another Air Force general claimed, "senior military officers think that the tempo is so disgustingly slow it makes us look inept." Another stated, in light of Desert Storm, OAF "is not Instant Thunder, it's more like Constant Drizzle."[435] The Gulf War paradigm of strategic attack had become Air Force doctrine by the time of Kosovo, but Kosovo posed a different problem than Kuwait in 1991. Kosovo aimed to stop genocide with airpower

[431] Lambeth, *NATO's Air War for Kosovo*, 25-26.
[432] Combined Air Operations Center where the air activity of different services and coalition partners are pulled together into a coherent air campaign.
[433] Julian Tolbert, personal conversation, April 20, 2015.
[434] Lambeth, *NATO's Air War for Kosovo*, 196. Robert Pape articulated a typology of coercive strategies: risk, punishment, denial, and decapitation. In OAF, punishment was not working and the military leaders sought more of a direct-leadership pressure strategy that did not equate to Pape's decapitation. For more information see, Robert A. Pape, *Bombing to Win: Air Power and Coercion in War* (Ithica, NY: Cornell University Press, 1996).
[435] Lambeth, *NATO's Air War for Kosovo*, 180-181.

as the main military effort, while Kuwait aimed to evict Iraqi troops with air *and* ground power, if necessary. Still, the strategic attack paradigm called for rapid results, regardless of the political objective desired. Gradualism and incrementalism—abhorrent traits from Vietnam transferred to resistance of the OAF strategy—were normal aspects of compellence. Those characteristics were difficult for many commanders to stomach.

A second aspect of general strategic theory that played a minor role in OAF development was *The Schlesinger Doctrine*. James Schlesinger had worked at RAND and became the first civilian strategist rising to the position of Secretary of Defense (1973-1975; after serving as Director of the CIA in 1973). The Schlesinger Doctrine focused on nuclear weapons, arguing for flexibility in nuclear capabilities to "implement a number of options."[436] Schulte learned the Schlesinger Doctrine from Leon Sloss who led a nuclear targeting study in the Pentagon that helped lay the basis for PD-59.[437] Schulte met Sloss in the early 80s when Schulte interned at Carnegie and then worked for him at Leon Sloss Associates on a contract for what is now the Defense Threat Reduction Agency (DTRA).[438]

Schulte recalls Sloss emphasizing how the Schlesinger Doctrine highlighted the importance of understanding the motivations of actors that the US sought to deter. For the "Single Integrated Operational Plan" (SIOP)[439] guiding possible nuclear warfare for

[436] Lawrence Freedman, *The Evolution of Nuclear Strategy*, 3ed. (New York: Palgrave McMillian, 2003), 361.
[437] Freedman, *The Evolution of Nuclear Strategy*, 376. President Carter's Presidential Directive 59 was "aimed to improve deterrence by improving the capacity for a prolonged but limited nuclear war."
[438] Greg Schulte, email correspondence, May 2, 2015.
[439] Lawrence Freedman, *The Evolution of Nuclear Strategy*, 3ed., (New York: Palgrave McMillan, 2003) 232, 395. The SIOP was the U.S. plan for nuclear war. "It describes to the President the range of targeting options he would have available should the moment of truth arrive. It is framed in terms of launch procedures and the target sets against which weapons will be launched. It gives a terrible, practical reality to the familiar clichés of nuclear war."

example, Sloss believed American leaders needed to specifically influence the thinking of the Soviet General Staff and their theory of victory, not "the Soviets" in general. America's posture should convince General Staff officers that they could not achieve their wartime objectives in *any* type of nuclear conflict and that the US would accordingly "prevail." As Schulte set about creating "The Strategic Campaign Plan" for Kosovo, Sloss's admonition to focus on "the people you (actually) have to influence" was on his mind.[440] In this manner, the Schlesinger Doctrine foreshadowed the nuanced human-network approach that would underpin "crony attack" and associated information operations against Milosevic's main benefactors.

General strategic theory also contributed the concept of *asymmetry* to OAF development. This word has many meanings. The doctrinal definition of asymmetric warfare is embedded in "irregular warfare" as, "A violent struggle among state and non-state actors for legitimacy and influence over the relevant population(s). Irregular warfare favors indirect and asymmetric approaches, though it may employ the full range of military irregular warfare — and other capacities, in order to erode an adversary's power, influence, and will."[441] When commenting on Kosovo, Short said, "I am, quite frankly, a big fan of asymmetric warfare," and looked to air power to provide him with that advantage.[442]

Finally, like air operations in World War II and Desert Storm, OAF depended on a *cumulative strategy* rather than a sequential approach. This distinction in General Strategic Theory stems from Naval strategist, Rear Admiral J.C. Wylie. In regards to

[440] Greg Schulte, personal conversation, April 21, 2015.
[441] Joint Publication 1-02, 189.
[442] Tolbert, "Crony Attack," 41.

"sequential strategies" Wylie wrote that most planners normally think of war "as a series of discrete steps or actions, with each one of this series of actions growing naturally out of, and depend upon, the one that preceded it." Strategies in the World Wars appear this way by analyzing the large steps that led to victory. In "cumulative strategy," on the other hand, "the entire pattern is made up of a collection of lesser or individual actions, but these lesser or individual actions are not sequentially interdependent. Each individual [action] is no more than a single statistic, an isolated plus or a minus, in arriving at a final result."[443]

Cumulative strategy explains a key reason why Milosevic eventually capitulated to NATO demands. A definitive study on this question is by RAND's Stephen Hosmer, *The Conflict Over Kosovo: Why Milosevic Decided to Settle When He Did*.[444] Hosmer's work, plus conversations with Lt Gen Short, led Air Force Colonel Julian Tolbert[445] to summarize the explanations as:[446]

1. Milosevic was unable to force NATO to divide.
2. Strategic bombing in Belgrade produced a shift in popular opinion for the war.
3. Milosevic expected significant escalation in the bombing if he rejected NATO terms.
4. Milosevic feared a threatened NATO ground invasion.
5. Russia turned against Milosevic and urged him to accept terms.
6. Russia secretly promised to help Milosevic secure a Russian quadrant in occupied northern Kosovo.
7. NATO's terms were just generous enough to enable him to want to stay in power.
8. Milosevic's cronies put pressure on him to end damage to their companies, infrastructure, and economy in general.
9. Some combination of some--or all--of the above.

[443] J.C. Wylie, *Military Strategy: A General Theory of Power Control* (Annapolis, MD: Naval Institute Press, 1989), 117-118.
[444] (Santa Monica, CA: RAND, 2001)
[445] Then Major Julian Tolbert served as the B-2 liaison to the Combined Air Operations Center with direct and routine interaction with the JFACC Lt Gen Mike Short.
[446] Tolbert, "Crony Attack," 37, 38.

Barry Posen adds that Milosevic had maximized his strategy, obtained as much as he could, and got a better deal than that offered at the Rambouillet negotiations.[447] Any answer points to the work of a cumulative strategy vice sequential.

Level 3 Paradigm: Alliance-Limited Strategic Attack

After Desert Storm, there was a sense of "that is how you do it." John Warden and Dave Deptula published compelling articulations of the strategic attack paradigm between 1992-1995. As noted, strategic attack worked its way into Air Force doctrine. Later, a volume "Strategic Attack" was published as AFDD 3-70.[448] A joint version of Strategic Attack—joint publication 3-70—remains in draft form and unpublished.[449] By 1999, strategic attack was the paradigm within which OAF took place.

Nevertheless, the strategic attack paradigm guiding OAF contained subtle differences from that guiding Desert Storm. OAF was its own species of strategic attack. In Tolbert's view:

> The strategic attack in Desert Storm seemed to have an objective of imposing "strategic paralysis" by cutting the leadership off. While Lt Gen Short in OAF did talk about "cutting the head off the snake," in practice the scheme became imposing cost or perception of futility on the leadership, while allowing it full capability to [its own] C2. In each case the strategic objective was forcing withdrawal of forces from an invaded (or "cleansed") territory, but the OAF methodology built on the Desert Storm case.[450]

Lambeth confirms this nuance by noting how political leaders constrained commanders from pursuing paralysis, with the inherent gradualism of the campaign destroying any

[447] Posen, "The War for Kosovo," 79-80, 82.
[448] Strategic Attack (AFDD 3-70), https://doctrine.af.mil (accessed May 3, 2015).
[449] Joint Doctrine for Strategic Attack (JP 3-70 draft), http://www.bits.de/NRANEU/others/jp-doctrine/jp3_70sd.pdf (accessed May 3, 2015). The second draft which remains unpublished is fully fleshed out with the date of May 11, 2001, Second Draft. After 9/11, this doctrine was de-emphasized in the joint process where it remains today.
[450] Julian H. Tolbert, email correspondence, April 27, 2015. For a detailed description of Warden's influence on OAF concepts see Henriksen, *NATO's Gamble*, 40-45 and 53-56.

"shock potential" or surprise.[451] At the time, John Warden was also not pleased that gradualism eclipsed the application of Desert Storm airpower theory.[452] The enormous contribution of the NSC staff to designing strategy, and their emphasis on the principles of coercive diplomacy, explain much of Warden's angst—as well as that of Short and other air commanders.

In the end, one can conclude that OAF transpired within the Strategic Attack paradigm, but with a totally different theory of action tailored to the character of war in Kosovo with its substantial domestic and Alliance-driven limitations. The portion of the strategy that most matched the strategic attack paradigm was the classified portion that most observers knew least about: crony attack.

Level 4: Crony Attack

The primary concepts in the OAF theory of action were crony attack, human network analysis, "pseudo-5 Rings targeting," and serial warfare (as opposed to parallel warfare in ODS). *Crony attack* strategy "targets key elite supporters of an enemy leader to effect policy change in the attacker's favor. It is also one of a set of tools used in coercive diplomacy."[453] Certain planners created elaborate "influence diagrams" to gradually threaten supporters, oligarchs, or cronies of Milosevic. Targets included factories and other facilities supporters held dear. Such individuals included Nikola Sainovic (a federal vice president siphoning funds from factories); Dusan Matkovic (an ex-SPS party leader); Jovan Cekovic (a former SPS army officer who arranged arms

[451] Lambeth, *NATO's Air War for Kosovo*, 200, 243.
[452] Henriksen, *NATO's Gamble*, 44.
[453] Tolbert, "Crony Attack," v.

deals with Russia and Iraq); and Dragan Tomic (an oil industry leader).[454] The logic of crony attack varied from World War II Morale Effect theories in that specific individuals, who have power to actually influence the decision-making of the leader, have their possessions and financial resources targeted, rather than the populace at large.

For crony attack to work, several prerequisites were necessary. First, regime characteristics had to be vulnerable to such an assault. Serbia was still in the process of privatizing its industry post-Tito; thus, Serbian factories were still autocratically controlled by a relatively small number of people. These elites were susceptible because the goods and services of the "publically" held industries would go into their pockets (thus the term "cronies").[455] Second, outlining the details of this power network required outstanding intelligence work. Ben Lambeth notes the Central Intelligence Agency likely brought its expertise to bear.[456] Finally, as precise bombing wrecked their assets, the cronies began to clamor to Milosevic to halt his genocidal activities in Kosovo to preserve their assets.

An innovation of OAF could be called, an elaborate behind the scenes *human network analysis*. Social network analysis is a discipline with deep roots but how it has been applied to military affairs is sporadic.[457] OAF efforts to do network analysis fed not only crony attacks but also a broader information operations campaign with fact-based techniques to influence the opinions of people who mattered most in Serbian affairs

[454] Tolbert, "Crony Attack," 31, 34.
[455] Tolbert, "Crony Attack," 29, 30.
[456] Lambeth, *NATO's Air War Over Kosovo*, 71.
[457] For background on this social science, see Rowley, Timothy J. "Moving beyond dyadic ties: A network theory of stakeholder influences." *Academy of management Review* 22, no. 4 (1997): 887-910; Noel M. Tichy, Michael L. Tushman, and Charles Fombrun. "Social network analysis for organizations." *Academy of management review* 4, no. 4 (1979): 507-519; and Roger Leenders, "Modeling social influence through network autocorrelation: constructing the weight matrix." *Social networks* 24, no. 1 (2002): 21-47.

(whether or not they were part of Milosevic's inner circle). A product called the "CENTCOM Matrix" (US Central Command) detailed the technique, which consisted of the detailed human network around Milosevic.[458] "Our concept of war termination rested importantly on influencing Milosevic's personal decision-making."[459] Schulte observed the information operations approach embodied in human network analysis provided a sound complement to crony targeting.

Although the serial nature of OAF warfare was antithetical to Instant Thunder's rationality, the targeting theory underpinning OAF produced a *pseudo-5-Rings* approach. The pseudo 5-Rings approach is exemplified in the different theories of Clark and Short. As Clark noted in his memoirs, he and Short relived "old tensions" of both World Wars on allocating air power against fielded forces versus strategic targets.[460] NATO air power attacked Serbian fielded forces (5th ring) as a political necessity to demonstrate a vigorous effort to halt genocide. Precision air power also struck Serbian infrastructure (3th ring) causing Clark to remark "OAF was the only air campaign in history in which lovers strolled down riverbanks in the gathering twilight and ate at outdoor cafes and watched the fireworks."[461] Serbian infrastructure (3rd ring) increasingly received the brunt of NATO bombs, causing the respected economist at Belgrade University, Mladjan Dinkic, to call the air strikes an "economic catastrophe."[462] During OAFs last two weeks, attacks began in earnest on Belgrade's electrical power grid (2nd ring) to complement attacks that "zeroed out" Serb oil refining capability. Finally, crony attacks devastated

[458] Greg Schulte, personal conversation, April 21, 2015.
[459] Greg Schulte, email correspondence, April 22, 2015.
[460] Clark, *Waging Modern War*, 243-244.
[461] Quoted in Lambeth, *NATO's War Over Kosovo*, 43.
[462] Quoted in Lambeth, *NATO's War Over Kosovo*, 42.

Serb leadership functions (1st ring). One night, bombing wrecked Milosevic's prized get-away mansion to let him know everything he held dear would be incrementally destroyed until he gave in.[463]

Level 5: Ways

The State Department's emphasis on applying the tenets of coercive diplomacy significantly reduced the possible ways that air power could be used to stop Serbia's ethnic cleansing. Once State retained the lead in a "turn-the-screw" styled coercive diplomatic effort backed by air power, a Desert Storm-like massive bombing campaign was not an option. Such an approach would not have suited the character of the war—especially NATO's political objective.

Clinton's desire to solidify NATO further limited the ways available to apply air power. Once the President and his principals had set liberal institutionalism in motion, assuring that all kinetic actions during OAF would result from the unanimous approval of NATO nations, the preferences, morays, cultures, and taboos of other countries significantly restricted air power options. Each NATO nation waged a war of choice and had the moral latitude to be as picky as desired about "acceptable" ways to use air power. Nevertheless, the delay in realizing consensus caused a human tragedy to unfold in Kosovo where Milosevic's "village a day keeps NATO away" approach to ethnic cleansing increased in severity.[464]

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[463] Col (ret) Bob Colella, personal conversation, April 20, 2015. Colella was the B-2 weapons officer at Whiteman planning and flying the first B-2 combat sorties in history. For more information see Rebecca Grant, *The B-2 Goes to War* (Arlington, VA: IRIS Press, 2001), 38, 48.

[464] Schulte, "Strategic Lessons for an Era of Austerity," 16. Adversaries operating just below the U.S. threshold for response is not a new phenomenon.

Four days before NATO entered the war, Sandy Berger briefed the initial part of the air campaign to the President and NSC. Air strikes would begin against Serb air defenses with cruise missiles, (AGM-86C CALCMs, conventional air launched cruise missiles, and BGM-109 Tomahawks), B-2s, F-117s, and other manned aircraft, with US providing 50% of the air strikes. Contingency operations included raids on Serbian military and police units if the Serbs intensified attacks on Kosovar Albanians (which the Serbs did). Another contingency included raids on Serbian forces who attacked NATO forces anywhere in the region. These reprisal strikes could target Serbian C2, infrastructure, and "national power projection resources," along with a warning about unintended civilian casualties that might occur.[465]

In a final diplomatic gesture before bombing, President Clinton dispatched Ambassador Holbrooke to present an ultimatum to Milosevic in Belgrade on March 22. Six months earlier, the NSC had anticipated such a move.[466] Holbrooke's exchange with Milosevic went as follows. Holbrooke said: "You understand our position?" Milosevic: "Yes." Holbrooke: "Is it absolutely clear what will happen when we leave, given your position?" Milosevic: "Yes, you will bomb us. You are a big and powerful nation. You can bomb us if you wish."[467] Later, Holbrooke added that Milosevic was "tricky,

[465] Sandy Berger, "Military Options," March 20, 1999 memo page 1 & 2, Adobe Acrobat Document, "Declassified Documents concerning Kosovo," *Clinton Digital Library*, 2015, http://clinton.presidentiallibraries.us/items/show/16195 (accessed April 26).
[466] Sandy Berger, "Military Options," March 20, 1999 memo page 1 & 2, Adobe Acrobat Document, "Declassified Documents concerning Kosovo," *Clinton Digital Library*, 2015, http://clinton.presidentiallibraries.us/items/show/16195 (accessed April 26).
[467] Bruce W. Nelan, "Into the Fire," Time, April 5, 1999, 35. Quoted in Lambeth, *NATO's Air War Over Kosovo*, 10.

evasive, smart, and dangerous," further noting that his mood in the final confrontation was "calm, almost fatalistic, unyielding."[468]

On March 24, the 78-day air war commenced.

Even within the very narrow set of ways that could be chosen (largely air only, gradual, and highly filtered internationally) one of the most creative theories of action to help guide air strategy appeared in the form of Crony Attack Theory. Operation Matrix—the moniker ascribed to crony attack, according to analyst William Arkin[469]--proved to be an essential way of applying air power that contributed to Milosevic's decision to capitulate.

In addition to crony attacks by air power, Operation Matrix leveraged other "DIME" elements to yield success. One such element was the "3M strategy." 3M stood for influencing the monetary assets of Milosevic and his cronies, activities of the Ministry of the Interior, and the "media" or his information apparatus—the three pillars of power for the Milosevic regime.[470] 3M combined with the Operation Matrix lines of operation to include:[471]

1. Computer network attacks
2. Phone calls to owners of factories to warn of attacks within 24 hours
3. Information operations using the "CENTCOM Matrix" dovetailed with bombing
4. B-2 attacks on factories such as the Bor copper smelter and Smederevo iron works
5. Crony attacks including strikes on the possessions of retired army officers who ran arms deals with Russia
6. Denying cronies exit from Serbia when the pressure intensified
7. Covert operations
8. Other psychological warfare

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[468] "'He Was Calm, Unyielding,'" *Newsweek*, April 5, 1999, 37. Quoted in Lambeth, *NATO's Air War Over Kosovo*, 10.
[469] Tolbert, "Crony Attack," 31.
[470] Tolbert, "Crony Attack," 32.
[471] Tolbert, "Crony Attack," 31-35.

9. Sanctions

The psychological operations were based on "influence diagrams" analyzing Milosevic's main pillars of power and how best to coerce—a technique that would later feature prominently in the 9/11 Wars.[472] Military theory added "pseudo" 5-Rings targeting, which put oil, electricity, infrastructure, and, fielded forces at risk. As Tolbert noted, "to the extent that Milosevic was pressured by his wife and other cronies to give in, the crony attack scheme worked… The [Serbian] anti-war group gained most of its influence with Milosevic's wife. She reportedly was becoming 'increasingly hysterical as the bombing intensified.'"[473]

In the end, while Russian diplomacy and the threat of a ground invasion also helped to coerce Milosevic, OAF helped prepare DoD for a response to 9/11. The humanitarian war in Kosovo informed the Air Force—and civilian planners—much about designing the ways that air power and other instruments can combine into a hypothesis about how to accomplish the nation's diverse political goals for each turn in the changing character of war.

Analysis

First, not even the most restrictive political context can limit a strategist's ability to find a way to win through tailoring creative theories of action. Given the right ends, there is always a way. Crony Attack in Allied Force leaves one to wonder if we emphasize creativity enough in strategic education. The cleverness required to find a way to win in any context may not be sufficiently emphasized in strategy education. This

[472] Greg Schulte, personal conversation, April 21, 2015.
[473] Tolbert, "Crony Attack," 35, 37.

may be because the theory-strategy nexus is sufficiently vague for students and practitioners. Actors trade in theory—wittingly or unwittingly—and it is difficult to comprehend the gravitas of this process if the theory-to-strategy nexus is treated like a "black box" in which we simply know something important is going on but cannot explain it. Being clear about how theory substantiates suppositions for selecting certain ways can improve our routine ability to tailor it in new approaches as demanded by the ever-changing character of war.

Second, a theory perspective presents a different narrative about the power of strategy in Kosovo in light of the extreme restrictions placed on the strategists searching for a theory of victory that fit those restrictions. Yes, even though the political context was highly restrictive, the U.S.-led NATO coalition still enjoyed air superiority, a willing land partner in the KLA, secure basing, international support against ethnic cleansing, and unfettered resupply. However, by focusing on the narrowness within which the strategists operated rather than the military balance of power, we are better able to isolate the power of ideas at play in Allied Force. The restrictions upon strategists were numerous yet they *tailored theory into a unique and successful hypothesis to match the changing character of war*. Improving this skill of leveraging theory for advantage in any context is the object of this research.

Third, Kosovo highlights the theory-seam between State and DoD and between George and Schelling. In pure war, State theoretically chops the effort to the military until it achieves the aims of cooperation. In such settings like World War II, the military actors are even the ones coordinating surrender and signing terms of peace. The State players never fully relinquished the effort to the military instrument of power. If one

places the theory of George and Schelling together this seems completely compatible but Kosovo was often critiqued for the actors not comprehending this compatibility nor making it clear to all involved. First, tacit ultimatum loomed during the long planning phase at the NSC. Then ultimatum failed. As Phase 1 moved out into a "try and see" approach, State and NATO civilian leaders still held the reigns on the main effort thinking they would swoop in quickly after the short-war assumption proved true. Yet even as Phase II turned into something that looked more like an offensive "turn the screw" form of coercive diplomacy, the military instrument moved into full blown "coercive warfare" defined by Schelling while State continued to hold the reigns, hold the NATO coalition together, honor NATO's numerous requests, impose those changes on the military, and stand ready to swoop in when the screw was sufficiently tight. The combined logic of State and DoD—George and Schelling—may be why the official after action report stated the war was "not a traditional military conflict."[474] In retrospect, the State and DoD seam just looks like the normal seam between coercive diplomacy and coercive warfare. If this seam is not understood, the gap is filled by civilian-military complaining that diverts intellectual energy away from the pure ambition of finding a way to win.

Fourth, Kosovo paints a really diverse picture of where theorizing can take place. In WWII, theorizing happened amongst traditional actors in traditional places. In ODS, much of the theorizing happened in the basement of the Pentagon through a dynamic mix

[474] "Kosovo/Operation Allied Force After Action Report," 31 Jan 2000. (United States: Department of Defense, 2000), *U.S. Declassified Documents Online* (accessed 27 Feb. 2016).

of younger officers committed to explaining a new theory of action and “open planning.” In OAF theorizing seemingly happened everywhere but included a thoughtful bridge-builder in Schulte, a classified organization that remains unidentified in this case study, intelligence players who studying the oligarchic structure on the ground in Kosovo, and lesser known USAF weapons officers. By placing all four theories of action side by side in this thesis, it seems less important where theorizing is happening but that must to gain advantage through intellectual advancement of concepts and logic that lead to winning in virtually any context.

CHAPTER 5
UPSTREAM MODEL OPERATIONS

This chapter explores other operations of the model with three related questions about the theory-strategy nexus. How do the levels actually interact and combine? Are there other contemporary theories of action that follow the Upstream Model? Does the model apply more broadly to other fields and levels of organization? Exploring these questions helps to solidify the operations of the model that emerged from the World War II and Post Cold-War case studies.

Hypothesis and Strategy

So how do the levels of theory actually combine? It is fascinating that several authors have alluded to the role of hypothesis in strategy without making it a serious object of study. This research shows the skill of guessing—developing a hypothesis—has not been completely transferred to the tradecraft of making good strategy.

As described in the introduction, a hypothesis for strategy means inductively and intuitively formulating a supposition of *how* to win or, achieve a desired outcome. For example, when students are asked to craft a strategy to balance power in Eastern Europe or counter global violent extremism, what they offer are their hypotheses. Several methods exist for diagnosing a strategy situation. Several methods also exist for matching means with ends. Nor is there any shortage of literature on how to plan once a strategy has been determined. Yet when it comes to the process of formulating clever ways in a strategy, students are often left at sea. The military "design school" attempts to address this void by finding better designs before planning kicks in. However, even the

best literature from the military design school rarely mentions a simple and ancient approach that has not been formally transferred to general strategic theory: constructing a hypothesis.[475] Numerous authors hint at a relationship between hypothesis and strategy, but the references are sporadic and thin. The sheer volume of these hints indicates there is something critical about guessing and strategy. But the sporadic nature of these references indicates a gap in U.S. strategic culture.

Richard Rumelt discusses strategy as a hypothesis in the context of an analogy. Rumelt made this observation when trying to explain strategy to a group of frustrated scientists who were trying to develop one. "The problem of coming up with a good strategy has the same logical structure as the problem of coming up with a good scientific hypothesis. A good strategy is, in the end, a hypothesis about what will work."[476] Yet, in passing, Rumelt published this key observation as an idea fragment.

Hal Brands' two prominent definitions of grand strategy focus on the role of theory. While he does not use the word "hypothesis," he does define grand strategy by the use of theory and logic—the content used in hypothesis. He writes, "Grand strategy… is the *theory*, or *logic*, that guides leaders seeking security in a complex and insecure world."[477] This definition correctly implies that theory is often tantamount to the source of logic. In the definition that opens his work, Brands replaces "theory" with,

[475] See for example U.S. Army, School of Advanced Military Studies. *Student Text, Version 2.0, Art of Design* (Fort Leavenworth, KS: School of Advanced Military Studies, March 2010). In this thoughtful work on the design school, there are at least six ways hypothesis is talked around: "underlying logic" (p. 12), "theory" (p. 33), "rationale behind a design concept" (p. 138), "the logic that underpins [an operational approach]" (p. 138, 139), and "a broad conceptualization" (p. 138). While the idea is not amplified, hypothesis appears once in this comprehensive source but is synonymous with "models" that form the basis of a design concept (p. 141).
[476] Rumelt, *Good Strategy, Bad Strategy*, 243.
[477] Hal Brands, *What is Good Grand Strategy: Power and Purpose in American Statecraft from Harry S. Truman to George W. Bush* (Ithaca: Cornell University Press, 2014), 3 (emphasis added).

"intellectual architecture" to describe the source of logic for selecting the ways for a strategy. "Grand strategy is the *intellectual architecture* that lends structure to foreign policy; it is *the logic* that helps states navigate a complex and dangerous world."[478] When a strategist is asked to provide the logic for choosing the ways that guide a strategy, what he/she provides is a hypothesis tailored to a specific situation. Thus, as Brands suggests in his definitions of grand strategy, logic and theory wed. Theory is the source of logic, and logic, in turn, provides the importance of the ways selected for a strategy.

F.G. Hoffman, a Senior Research Fellow at the Institute for National Strategic Studies, turns to hypothesis to underscore one of his eight considerations for grand strategy. Consideration number four on "competition" paints the adversarial setting as "the essence of the strategy function." Strategy is inescapably framed by competition.[479] In this context, Hoffman notes that strategists generate a hypothesis that contains the logic of a strategy. "The strategist exploits the comprehension generated from context and cognitively creates a strategic concept and logic that represent an untested hypothesis… to attain policy ends within the means… and constraints that

[478] Brands, *What is Good Grand Strategy*, 1 (emphasis added).
[479] An alternative view is presented in business literature. See W. Chan Kim and Renée Mauborgne, *Blue Ocean Strategy: How to Create Uncontested Market Space and Make the Competition Irrelevant* (Boston, Mass.: Harvard Business School Press, 2005), 6, 7. Military strategy is critiqued as inherently simplistic and limited by the concepts of competitors (and terrain). This thinking is labeled "red ocean" strategy, which means locked into accepting, "the key constraining factors of war—limited terrain and the need to beat an enemy to succeed." On the other hand, the creative "blue ocean" strategy makes competition irrelevant. In business, Apple is used as an example of a blue ocean-styled company who, instead of going tit-for-tat with rivals, went in a completely different direction with the "i" products—a move which Sun Tzu and Liddel-Hart would approve of as an indirect approach. However, in business the enemy does not intend to kill your person or destroy your buildings so Dr. Hoffman's point is valid for security strategy.

exist."[480] Hoffman, like Brands and Rumelt, indicates that concept and logic wed in a strategy supposition which is simply a hypothesis.

Columbia University professor William Duggan also indirectly mentions hypothesis in an attempt to bridge the fields of creativity and strategy. Duggan has studied how aspects of innovation theory can transfer to creative strategy development.[481] He claims that methods for strategy and methods for creativity are disconnected by two different sets of literature. Duggan proposes a method for promoting creative strategy by bridging the two worlds, as it were. His rationale is based, unknowingly, on Col John Boyd's articulation of using deduction to analyze a situation and induction to generate logic for a response.[482] In the introduction, Duggan presents an idea about the role of hypothesis in designing creative strategy. "There is no logical answer for any of these questions. In all cases, we do our best to make an educated guess. You use your judgment, and I use mine."[483] His reference to an educated guess is a nod to strategy as hypothesis.

Another example comes from innovation literature in the business world. In 2002, Joan Magretta wrote "Why Business Models Matter." She plainly acknowledges that models do not represent complete strategies. Yet she endeavored to salvage the value of a "model" to mean a descriptive theory that "turns on an insight about value." This observation provides the logic for how a business can deliver value to

[480] F.G. Hoffman, "Grand Strategy: The Fundamental Considerations," *Orbis*, 58, no. 4 (Fall 2014): 479.
[481] For further background see William Duggan, *Strategic Intuition: The Creative Spark in Human Achievement* (New York: Columbia University Press, 2007).
[482] Boyd's description parallels Duggan's 2013 construction of "search" (breaking reality down with destructive deduction) and "combine" (using creative induction and intuition). Duggan's "combine" and Boyd's "creative induction" are related terms for the skill of hypothesis.
[483] William Duggan, *Creative Strategy: A Guide for Innovation* (New York: Columbia University Press, 2013), 8.

customers. In this context she wrote, "Business modeling is…the managerial equivalent of the scientific method—you start with a hypothesis, which you then test in action and revise when necessary."[484] She then explores two ways to test a hypothesis before it moves into operations.

In education, the US Army War College organized a study on teaching strategy in response to concerns over strategy in the 9/11 wars. Published in 2009 as proceedings, two authors mention "hypothesis" in their teaching approaches. One of these, Robert Kennedy, set forth a practical guide to strategic thinking. Describing strategy development as a blend of art and science, he also notes that strategy involves the testing and analysis of alternate hypotheses.[485] Ross Harrison, author of *Strategic Thinking in 3D*, observes that students should do internships because they get exposed to other strategy design methods.[486] In this context, he cites the "McKinsey Method" which involves hypothesis construction as one its four stages of strategy development.[487] Yet in both the Kennedy and Harrison essays, the term hypothesis appears only in passing.

In practice, hypothesis has found one clear home. Arriving at a "development hypothesis" is a routine part of the strategic culture at the United States Agency for International Development (USAID). USAID has developed a novel strategy design method called "The Results Framework." This agency has a rich strategic culture, perhaps because it often tackles horrific missions (genocide in Africa, natural disasters like the earthquake in Haiti, epidemics like Ebola, etc.) with very limited resources.

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[484] Joan Magretta, "Why Business Models Matter" in *Harvard Business Review on Business Model Innovation* (Boston: Harvard Business School Publishing Corporation, 2010), 2, 8.
[485] Marcella, ed., *Teaching Strategy: Challenge and Response*, 16.
[486] Marcella, ed., *Teaching Strategy: Challenge and Response*, 302.
[487] Ethan M. Rasiel, *The McKinsey Way: Using the Techniques of the World's Top Strategic Consultant to Help You and Your Business* (New York: McGraw-Hill, 1999).

Within a "Results Framework," country leaders create a hypothesis that "describes the theory of change, logic, and causal relationships between the building blocks needed to achieve a long-term goal… The hypothesis should contain specific 'if/then' statements that reference the evidence that supports the causal linkages."[488]

On one hand, while strategy as a hypothesis is touched upon by Rumelt, Brands, Hoffman, Duggan, Magretta, and the Army War College, the role of hypothesizing has not been fully characterized for strategy students, nor has it become a foundational subject in war colleges.[489] On the other hand, the USAID and business world (McKinsey Method) have highlighted hypothesis as a skill for strategists.

In addition to this survey of literature, making hypothesis a normal part of strategy tradecraft could improve the quality of strategy for other reasons.

First, as discussed in the introduction, guessing is in the fundamental nature of strategy since it deals with the future.[490] But does the average strategy practitioner realize this is what they are doing? Guessing? Once acknowledged, this realization instantly clarifies the type of cognition they are applying to the task of making strategy. As previously discussed, good hypothesis is based on premises but must always include assumptions--the only way to grasp unknown variables. The strength of the hypothesis therefore, can only be partially tested before implementation amidst the vicious action-reaction cycles of the real world. This future-assumption dilemma of strategy design

[488] United States Agency for International Development, "Functional Series 200 – Programming Policy, ADS 201 – Planning," (2014):13-14.
[489] See endnote 1 in this chapter for an example.
[490] Thomas Hughes, personal conversation, 10 July 2011. Dr. Hughes at the School of Advanced Air and Spacepower Studies asked me a question in conjecture, "isn't all strategy really a guess?" This led me to research who was using hypothesis—an educated guess—as a process for developing the ways portion of a strategy. The literature review in this paper summarizes this research. The following year, Barry Watts would make the same assertion in Thomas Mahnken, ed, *Competitive strategies for the 21st century: theory, history, and practice* (Stanford University Press, 2012).

demands passionate commitment to sharpen the skill of hypothesizing. Making the best guess—or the best strategy—comes down to making an *educated* guess about which premises and assumptions to combine with context into a sound hypothesis.[491] Generating a better hypothesis is a teachable skill, entails a rich literature base that can be transferred to strategy curricula, and relies on a strategists' previous exposure to hypothesis from other fields.

Second, a sound strategist must come to grips with vast aspects of reality—not just the military situation. This skill improves the likelihood of bounding the diverse factors that add up to a complete theory of the case. The strategist must roam far outside of general strategic theory to deal with subjects like macro-economics, international relations, political science, physics, history, ethnography, sociology, psychology, religion, and philosophy. Gray calls this the "multidimensionality of strategy." Multiple domains of theory combine with assumptions via hypothesis to provide a sound supposition for a strategy in a situation filled with unknowns. As such, advancing or tailoring theory via hypothesis is an essential skill for the strategist who plays in a very multi-dimensional business.

Third, strategy schools are full of rich education in their chosen aspects of strategic theory. Yet, what is the fundamental *skill* that goes along with that content? Some may answer this question by saying, critical thought. Others may answer by naming specific strategy development methods and neither group would be wrong at first

[491] For amplification in the philosophy of science see C. G. Hempel, *Fundamentals of Concept Formation in Empirical Science* (Chicago: The University of Chicago Press, 1952), 36. "An adequate empirical interpretation turns a theoretical system into a testable theory: The hypothesis whose constituent terms have been interpreted become capable of test by reference to observable phenomena. Frequently the interpreted hypothesis will be derivative hypotheses of the theory; but their confirmation or disconfirmation by empirical data will then immediately strengthen or weaken also the primitive hypotheses from which they were derived."

glance. Executing operational design, scenario planning, ends-ways-means modeling, or lesser-known methods like Prometheus[492] could all be considered specific skills that complement the use of theory. And students hunger for such practical skills. The "real" world demands them. But there is something else going on inside *each* of these methods aside from "kinds" of thought. The skill of making sound, perhaps even clever, suppositions attends every strategy endeavor. Thus, knowingly or unknowingly, hypothesis subtends each strategy method. As a result, teaching hypothesis as a skill would be a natural compliment to any strategy development method to which a school may be committed. Theory provides the content for ways and hypothesis provides the skill for combining that array of content with context. Teaching the ancient skill of hypothesis tells students what they fundamentally do with "all of this theory"—combine concepts into specific ways using a hypothesis of what may work in a given context.

Fourth, strategy as a hypothesis can ease an essential tension in strategy education. On one end of the tension, strategy professors are afraid of presenting strategy as formulaic by introducing methods. This could be called the "methods trap" in strategy. On the other end, strategy students can be tossed into the sea of practice with no real methods at all. The fear of being overly formulaic is rooted in things like the excessive repudiation of mechanistic thinking in the work of Antoine-Henri Jomini or summary judgments about US strategic bombing in WWII. This fear can reach to an unwillingness to even define the word "strategy" in curricula. Ross Harris felt the need

[492] John Warden and Leyland Russell, *Winning in Fasttime: Harness the Competitive Advantage of Prometheus in Business and Life* (Montgomery, AL: Venturist Publishing, 2002), 6, 47. There are ten basic steps in the Prometheus Model that are summarized in four categories: design the future, target for success, campaign to win, finish with finesse. These four categories lead a practitioner to ask four strategic questions. What future do we want to create? What system change is necessary for that future to become reality? Which leverage points in the system will move it in the desired direction? How will we know when we're finished, and what is the exit plan?

to slice through the jungle of strategy definitions with a typology as recently as 2012.[493] The School of Advanced Air and Space Studies does not provide an accepted definition of strategy. The 2014 National War College curriculum committed to Andrew Krepenivich's definition about creating asymmetric advantage, but not without intense debate. National War College also provided one strategy method, the Scenario Planning School, but faculty constantly noted that it was "not a schoolhouse solution". These are attempts to navigate the tension between formula and confusion. Strategy as hypothesis provides one way out of the methods trap by focusing on a core skill needed for whatever method a practitioner chooses to produce a strategy. Teaching the skill of hypothesis is a good middle ground to the strategy methods dilemma by providing a skill without being mechanistic about what form it takes.

Fifth, hypothesis can demystify the ways portion of strategy by connecting strategy students to a *familiar* skill. As demonstrated in the introduction, there is substantial confusion over the meaning of "ways" but the skill of generating them is, in fact, ancient. As noted, the summary of the "Great Books" places hypothesis as a distinct subject in the classics from Plato forward. Yet, we have not formally transferred this rich literary tradition to the practice of developing ways for a strategy. Thus, rather than resigning the development of ways to inscrutable genius or operational art, viewing strategy as hypothesis marries students to an actual skill that can be trained to fantastic sharpness using their own educational backgrounds and a rich literary tradition in the classics on hypothesis.

[493] Ross Harrison, *Strategic Thinking in 3D* (Washington DC: Potomac Books, 2013), 1-17.

Sixth, viewing strategy as a hypothesis honors the inherent art and science blend of strategy.[494] One potential downfall of the word "hypothesis" is the tacit assumption that it is resigned to the hard sciences. This is not so. Hypothesis actually provides an established method for incorporating the irrational, creative aspects of advancing theory in a logical manner. Applied to strategy this can help develop clever ways since hypothesis allows for "intuition interacting with experience." Thermopylae, Stirling Bridge, Enemy as a System, Crony Attack, the Afghan Model, and F3EAD are brilliant exemplars of creative hypothesis at work. These battlefield strategists melded concepts from across the levels of theory into something tailored to the character of their moment.

Seventh, hypothesis may support the ever-unfolding professionalization of strategy as a discipline. Is strategy a true specialization? While strategy has existed as long as war, there is literature devoted to this question.[495] Strategy certainly has its own body of theory like a specialization, albeit fractured. If you ask a military specialist about their classics they will think of Thucydides, Sun Tzu, and Clausewitz. If you ask a U.S. business strategist they will think of Porter, Mintzberg, and Christensen.[496] Nevertheless, there is a body of general strategic theory even if reasonable people may disagree on its boundaries. Adding hypothesis to the profession of strategy could be one part of the

[494] Donald Schon, *Educating the Reflective Practitioner* (San Francisco: Jossey-Bass Publishers, 1987), 41.
[495] For examples of this discourse see Paula Jarzabkowski, *Strategy as Practice: an Activity Based Approach* (London: Sage Publications, 2005) and Gerry Johnson et. al., *Strategy as Practice: Research Directions and Resources* (Cambridge: Cambridge University Press, 2007). Strategy originated from the military and can be traced back to Thucydides and Sun Tzu at a minimum. Perhaps this is why there are no comparable military works questioning, 'is strategy a real discipline?'
[496] That fact is, the strategist who has connected the importance of theory to outcomes is likely to be a voracious reader across disciplines in pursuit of J.C. Wylie's "widest possible field for [our] intellect to operate in." It is time to accept strategy as a meta-discipline rather than mimic the myopia of a philosopher who thinks ethics should not leave philosophy or of an engineer who believes systems thinking is resigned to engineering.

normal progression to view strategy as a bona fide subject of its own. A more modest claim would be, if strategy were to incorporate the skill of hypothesis it would be reminiscent of other formal subjects and specializations that have done so.

Finally, and perhaps most importantly, teaching strategy as a hypothesis channels students to the underlying theory upon which a strategy will turn and work. Current strategy development methods can easily lead practitioners to courses of action without critical thought about the soundness of the logic upon which they are based.[497] If executed correctly, this means all strategists should be theorists of sorts rather than a select few. Gray has worked to ensure that theory and strategy are not divorced, but in fact, theory and strategy are often divorced in practice. We would benefit from a skill that inherently fosters the melding of theory and action. Again, the military design school is marching in this direction but this school has not incorporated theories of action and hypothesis into its official and unfolding doctrine.

It goes without saying that hypothesizing is simply one skill and there are a few problems with taking the importance of this skill too far. First, there is a possibility of over-cooking its utility. Like discovery in the sciences, there is no singular, well-paved path through the vast world of strategic concepts. Sun Tzu touched on the vastness of potential ways in strategy when he wrote:

[497] There is sporadic literature on "theories of action" which precede an actual design but it appears that the Army is moving away from this good concept. An interim US Army Field Manual, FMi 5-2 v 7.0, once provided one of the clearest definitions for a theory of action. "The theory of action is a single logic that binds together the pattern of interventions into a coherent whole. The theory of action is not strictly part of the problem frame, but it usually emerges during problem framing as the design team realizes the nature of the intervention. The theory of action should be a simple and suggestive insight about how the interventions will be orchestrated to move towards the desired system."

> The musical notes are only five in number but their melodies are so numerous that one cannot hear them all. The primary colors are only five in number but their combinations are so infinite that one cannot visualize them all. The flavors are only five in number but their blends are so various that one cannot taste them all.[498]

Strategy as a hypothesis can simply provide strategy students one ancient skill to understand how the song, painting, or dish can be produced in Sun Tzu's analogy. Hypothesis could also be taken too far if it is considered universally helpful to all students. People who are gifted at strategy seem to need no techniques at all. People who are striving to become talented at the same may find that other skills or methods suit them better. Hypothesis is *a* skill vice *the* skill but it is one that is well suited to the discipline of strategy since it is always a guess about the future.

A second key problem with viewing strategy as a hypothesis is the vast potential for associating the very word "hypothesis" with "science-only." An unexamined opinion of hypothesis could lead students to view this sill as something they only did in their science classes. Teaching strategy as a hypothesis the wrong way, could easily turn it into something mechanistic, formulaic, or inartistic. In some way, this is the problem with most strategy methods and why strategy schools are afraid to present any one method as the "schoolhouse solution" to strategy making.

Third, the case studies require some inference since the actors in World War II and the Post Cold-War Era cases don't claim they are "hypothesizing." This problem is common to any historical examples where there is no precise evidence of what happened in the mind of the strategist. Yet, it does not follow that we cannot make

[498] Sun Tzu, *The Art of War* (Oxford: Oxford University Press, 2005), 137 (Chapt 5, sect 8-10).

reasonable inferences about how they combine theory to conjecture about how to use airpower. In these cases, what helps to make this leap is the assumption that the fundamental thought processes of humans as far back as ancient Greece were similar to our own (deduction-analysis, induction-synthesis, intuition, etc). Generating a hypothesis is one such fundamental thought process.

In summary, strategy as a hypothesis is worthy of consideration for strategy curricula. Hypothesis has been making a minor appearance in strategy literature which complements its major appearance in the classics of western civilization. With the exception of USAID and the McKinsey Framework, hypothesis appears largely as idea fragments in good books or articles. Yet, when students are asked to produce a strategy in the laboratory or practitioners in the Pentagon, it very much resembles a hypothesis. Further, when looking at the clever ways selected in some of the theories like Enemy as a System and Crony Attack, we may infer that hypothesis was at work there too and helpful to each cause. Among the benefits of teaching strategy as a hypothesis is the reliance on a well-established skill that has simply not been formally transferred to the field of strategy in a foundational manner. Most strategy students have a familiarity with this skill and thus, it can resonate if well taught. Further, like anything classified as a skill, it can be trained and trained intensely. As Rumelt noted, not all hypotheses in science are equally good.[499] Perhaps the same is true of hypotheses in strategy. Our very pursuit of good strategy can be accompanied with a commensurate passion for this one skill that appears close to the heart of a strategy: hypothesizing how to win by the logic of the ways we use means to achieve reasonable ends.

[499] Rumelt, *Good Strategy, Bad Strategy*, 247.

9/11 Era Examples

To continue seeing applied theory and hypothesis at work, the 9/11 era produced three examples of note. In the order they arose, the Afghan Model represents the period of time between October and December 2001 before the full-scale invasion of Afghanistan that led to nation-wide conflict against the Taliban (against which U.S. forces remain committed to this day). This theory of action was a new form of unconventional warfare (UW)[500] in support of indigenous forces (Northern Alliance) that combined super-empowered Operational Detachment Alpha (ODA) teams of green berets and augments with precision guided fires and ISR from the air. No one of these elements was brand new but the combination of concepts is becoming legendary. The image of this model was a high-tech man on an Afghan horse. The image is USAF combat controller Sgt. Bart Decker who was embedded with an ODA in Task Force Dagger.[501] This image inspired the memorial now at ground zero in New York City—a statue of a modern warrior on a horse.

The Afghan Model was a creative theory of action tailored to the character of war (who fought, how they fought, why they fought). The Afghan model matched the nature of the enemy, environment, urgency of the mission, technology and political timelines for results.[502] Partnership with the Northern Alliance allowed for the ad hoc engagement

[500] Unconventional Warfare - Activities conducted to enable a resistance movement or insurgency to coerce, disrupt, or overthrow a government or occupying power by operating through or with an underground, auxiliary, and guerrilla force in a denied area. Also called UW. (Joint Publication 1-0.2, 15 Jan 16).
[501] "The Longest War," USA Today (11 Sep 2011), http://usatoday30.usatoday.com/news/afghanistan-ten-years-of-war/index.html, (accessed 28 Feb 16).
[502] Craig Wills Richard Andres, and Thomas Griffith, Jr., "Winning with Allies: The Strategic Value of the Afghan Model," *International Security* 30, no. 3, no. Winter 2005/2006 (2005): 5.

with mass Taliban forces while the ODAs—"by, with, and through"—ultimately surrounded Bin Laden in the foothills of Tora Bora. At that time, the war changed. In pursuit of denying terrorist safe haven in Afghanistan, the U.S. sent a large conventional force against the Taliban—a force that remains in Afghanistan to this day. The denying-safe-haven theory will be discussed in the following chapter.

"Lines and Slices" represents another theory of action from the 911 era that was born during Phase 1 in Operation Iraqi Freedom (OIF) and lasted roughly to completion of Phase 3. The remarkable military success of Phase 1 OIF can be lost in the contemporary scorn of the war's purpose and the absence of strategy after the fall of Baghdad. If viewed from a purely military perspective, Lines and Slices was a theory of action that shed light on the overall logic behind a successful invasion to accomplish the political objectives. General Franks called this theory his "grand strategy" in a conversation with General Renuart.[503] This indicates the significance of the theory in the mind of the commanding general (not that his theory was truly grand strategy at work).

Lines and Slices in Iraqi Freedom Phase 1 worked very well for what it was designed to do but it was not comprehensive. Charles Ikle notes that when one uses the military instrument of power this is simply "Act 1" of a larger drama.[504] But if one could put oneself in the shoes of someone responsible for commanding the success of something this massive, you may understand why General Franks said the following to

[503] Tommy Franks, *American Soldier*, 1st ed. (New York: Regan Books, 2004), 341.
[504] Fred Charles Iklé, *Every War Must End*, 2nd rev. ed. (New York: Columbia University Press, 2005), 8.

Deputy Secretary of Defense the night before the Iraq War: "You pay attention to the day after, I'll pay attention to the day of."[505]

Finally, Joint Special Operations Command (JSOC) developed the F3EAD Model under General Stan McChrystal's command. The theory of action transformed basic kill/capture raids into a new operations and intelligence structure to approach terrorism from a true network perspective and defeat those networks with a network. McChrystal explained the meaning of each step in the process as one of his Lieutenant Colonels in Delta force first placed them on a power point slide.

> A target was first located and identified (find), then kept under continuous surveillance to ensure it hadn't moved (fix), while a raid force moved to capture or kill the target (finish). Material of intelligence value was secured and mined while detainees were interrogated to find follow-on targets (exploit), the information this exploitation yielded was then studied to better know our enemy and identify opportunities to further attack its network (analyze).[506]

Having a targeting cycle was not new. Operations and intelligence working together were not new. Defeating whole networks by speeding up the process and making intel the purpose of CT ops *was* new. Operators in the F3EAD model (find-fix-finish-exploit-analyze-disseminate)[507] of irregular warfare (IW) were focused equally--or more--on understanding the network rather than killing pieces of it.

With this new theory behind them, JSOC sought to eliminate "blinks" or gaps between the find-fix-finish-exploit-assess-disseminate phases of an operation as McChrystal put it:

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[505] Gideon Rose, *How Wars End : Why We Always Fight the Last Battle : A History of American Intervention from World War I to Afghanistan*, 1st Simon & Schuster hardcover ed. (New York: Simon & Schuster, 2010), 3.
[506] Stanley McChrystal, *My Share of the Task: A Memoir* (New York: Penguin, 2013), 153.
[507] "Commander's Handbook for Attack the Network," United States Joint Forces Command, 20 May 2011.

> The (friendly) network needed to expand to include everyone relevant who was operating within the battlespace. Incomplete or unconnected networks can give the illusion of effectiveness, but are like finely crafted gears whose movement drives no other gears. This insight allowed us to move closer to building a true network by connecting everyone who had a role — no matter how small, geographically dispersed, or organizationally diverse they might have been — into a successful counterterrorism operation.[508]

Operators quickly internalized the new theory of action to the point as evidenced by operator disappointment over not collecting enough intelligence from Bin Laden's house. On the helicopter flight out of Pakistan one operator wrote, "Part of me felt like we had failed despite the body at my feet. We weren't able to get as much intelligence as we could have. We left drawers unopened. The hallway on the second deck had stacks of boxes untouched… the [exploitation] wasn't up to standards."[509] The task force has just completed the most fantastic raid in U.S. history and some of the first emotions as they exfiltrated were disappointment that they could not gather more intelligence from Bin Laden's house to feed the exploit-assess-disseminate phases of dismantling the Al Qaida network. That was the power of F3EAD culture.

McChrystal captures the influence of theory upon the ways of JSOC ops in those days. At the multi-disciplinary level the general was influenced to see his younger leaders (Captains) as *entrepreneurs* of battle.[510] He needed his men to move past the mere tasks toward owning shares of the enemy's "market." The entrepreneurial spirit meant his captains would be looking for opportunities to exploit the enemy at a market level. The entrepreneurial insight stemmed from thinking about the great sea battle of Trafalgar, 1805. The French and Spanish fleets allied and outnumbered Admiral Horatio

[508] "Commander's Handbook," VI-7.
[509] Mark Owen and Kevin Maurer, *No Easy Day: The Only First-hand Account of the Navy Seal Mission that Killed Osama bin Laden* (United Kingdom: Penguin, 2012), 261.
[510] McChrystal, *My Share of the Task*, 153. See also the title of this chapter, "Entrepreneurs of Battle."

Nelson's British fleet. In the battle Nelson was killed but his captains rallied to defeat the French and Spanish coalition. McChrystal recalled thinking the battle was won before it was ever fought. Nelson had trained his men and left them with a principle that, "No Captain can do very wrong if he places his ship along side that of the enemy." McChrystal wrote, "He sent this guidance confident in their professional competence and in the entrepreneurial hunger he had stoked in them. Napoleon had done just the opposite, prohibiting his commanding Admiral from sharing the larger strategy with the French captains."[511]

At the paradigm level, McChrystal felt boxed in by the routine targeting cycle.[512] Doctrinally, CT operations fall under the paradigm of irregular warfare (which includes (unconventional warfare (UW), counter-terrorism (CT), foreign internal defense (FID), counter insurgency operations (COIN), and stability operations (STABOPS)). The standard targeting cycle of find-fix-track-target-engage-assess (F2T2EA) from Joint Publication 3-60 was not designed with IW in mind. F2T2EA certainly has its place but JSOC did the track-target-engage phase *all in one* self-contained action. Further, what they needed more was *expanding* the JP 3-60 "assess" phase into something faster and more proactive, thus "exploit-analyze-disseminate."

[511] McChrystal, *My Share of the Task*, 148
[512] Stan McChrystal, personal conversation, 4 Jan 16.

When Bennet had posted the F3EA model it added clarity (the "D" was added later) and allowed everyone to think about the overall problem in a new way. While finishing was JSOC's traditional strength, exploiting and analyzing now needed to become their main effort. Further, they could now step back and look at their business process and say, how can we do it better?[513] They began to think of each step in the process as indivisible and not linear—more like an organic entity. McChrystal noted, "we learned you actually can't subdivide; we needed to operate F3EAD in whole while being connected to every part of it." Then Bennett laid out blinks or gaps between each step as it reinforced the other steps in a non-linear fashion. "The problem was the blinks."[514] This led JSOC to greatly expand their network to include everyone who could help ensure there were no blinks. In these ways, the F3EAD theory became the seamless business model for selecting ways at the JSOC level of warfare. At this point, the guiding policy became, it takes a network to defeat a network. Then JSOC built one that was better than that of the enemy.

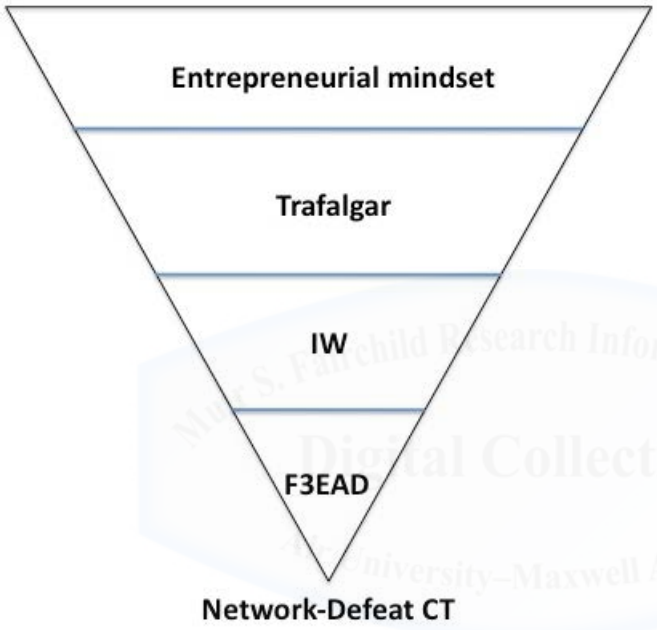

Figure 12: The Upstream Model for F3EAD

[513] Stan McChrystal, personal conversation, 4 Jan 16.
[514] Stan McChrystal, personal conversation, 4 Jan 16.

These three theories of action from the 9/11 era indicate the theory-strategy model is operating in our current era as well. Adding these 9/11 examples also enables some further synthesis. First, while these 9/11 examples are not amplified at length they seem to follow the basic progression of theories that provide the logic for selecting ways in strategy. The F3EAD case, in particular, seems to have aspects of all four levels woven into its creation (see figure 11). Further, while "Lines and Slices" would take more analysis to place it in a paradigm, the other 9/11 examples come from a completely different paradigm from the case studies of chapters 2-4 (see table 6). This indicates that the model doesn't require closely associated paradigms to work (i.e. strategic bombing and strategic attack are closely related but the Afghan and F3EAD models align with the irregular warfare paradigm).

Table 6: Multiple Paradigm Comparison

Eras	**Paradigm**	**Theory of Action**	**Ways**
WWII	Strategic bombing	Morale Effect Theory	Hamburg, Japan Firebombing, Atomic warfare
WWII	Strategic bombing	Industrial Web Theory	War on the sub pens, Dambuster raid, the oil plan
Post Cold War	Strategic attack	Enemy as a System	Warden's rings targeting
Post Cold War	Strategic attack	Crony Targeting	Serbian oligarchy targeting
9/11 Era	Irregular warfare	Afghan Model	Northern Alliance Al Qaida campaign (not the second effort against the Taliban)
9/11 Era	Irregular warfare	F3EAD Model	Global Al Qaida decapitation

Second, when placed all together the number and clarity of theories makes them seem as if making "theories of action" is a routine subject for strategists but it is not.

- Industrial Web Theory
- Morale Effect Theory
- Enemy as a System
- Crony Attack
- Afghan Model
- Lines and Slices
- F3EAD Model

Treating theories of action as a subject helps students to realize how important it is to create them or interrogate the ones they are working within to ensure they match the character of war they face. Placing a group of theories together that are related to airpower should add seriousness to the study of this subject in general, and the theory-strategy nexus specifically.

Apple and Containment

Is the Upstream Model robust enough to capture the theory-strategy nexus at other levels of organization and in other fields? As noted with the field of medicine and captured in Table 1, it appears the anatomy of the Upstream Model has basic parallels in other fields (see Table 1, Levels of Theory Comparison with Medicine). It appears that the same model also applies to the high performing examples in the business world.

Apple made a sociological assessment of American culture and determined that Americans are individualistic. The company concluded that other nations are less so, yet everyone retains some degree of individualism that can be leveraged. Apple then pursued a "blue-ocean" strategy that made the competition irrelevant by creating a completely different market.[515] Sun Tzu first articulated a similar concept around 350b.c. when he described the ultimate victory is to win without fighting.[516] This notion was filtered through the company's paradigm, labeled "The Apple Way."[517] Apple's paradigm can be summarized as finding the future. This paradigm involves making the product king, making the customer king, and breaking the marketing molds. The theory of action was the "i Revolution" to individualize and "demand stream" desired information and highly tailored "apps." Specific ways to embody this theory included the "i" series products: iphones, ipods, itunes, ipads, and now iwatches (see figure 13).

[515] See chapter 2, "Find the Future" in Jeffrey L. Cruikshank, *The Apple Way: 12 Management Lessons from the World's Most Innovative Company* (New York: McGraw Hill, 2006). The reference to "blue ocean" is a business strategy concept about pursuing frontiers and captures aspects of Apple's approach as described by W. Chan Kim and Renée Mauborgne, *Blue Ocean Strategy: How to Create Uncontested Market Space and Make the Competition Irrelevant* (Boston: Harvard Business School Press, 2005), 6, 7.
[516] Sun Tzu (Samuel B. Griffith, trans.), *The Illustrated Art of War* (New York: Oxford University Press, 2005), 115, 3-3. Apple's version of winning without fighting was to go in a completely different direction than the competition rather than contest them in established platforms.
[517] Jeffrey L. Cruikshank, *The Apple Way: 12 Management Lessons from the World's Most Innovative Company* (New York: McGraw Hill, 2006).

Exploring the broader operations of the model also leads to the levels of strategy dilemma. Strategy occurs at different levels of organization. Sir Basil Liddell Hart captured an early distinction in different levels of strategy. He defined "higher" strategy as *grand strategy* which is "to coordinate and direct all the resources of a nation, or band of nations, towards the attainment of the political object of the war--the goal defined by fundamental policy." His next level of strategy downward in scale was *military strategy*, which he defined as "the art of distributing and applying military means to fulfill the ends of policy."[518]

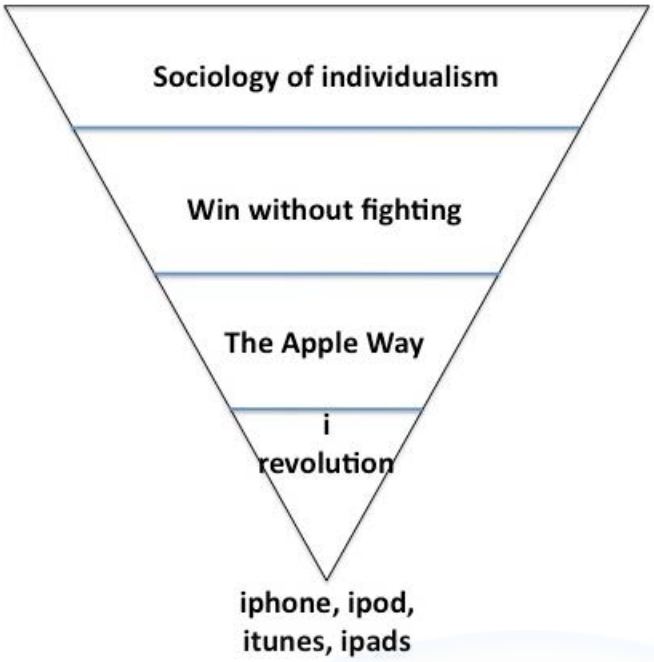

Figure 13: The Upstream Model for i-Revolution

For a basic lexicon of levels, we may begin with Dennis Drew and Donald Snow's introduction to the national security process. Drew and Snow recognized five classic levels of strategy.[519]

1. National Security Objectives (National Security Strategy, foreign policy, etc.)
2. Grand Strategy (or national policy for all instruments of power)
3. Military Strategy
4. Operational Strategy
5. Battlefield Strategy

[518] Basil Henry Liddell Hart, *Strategy: The Indirect Approach*, 4th ed. (London,: Faber, 1967), 335.
[519] Dennis M. Drew and Donald M. Snow, *Making Twenty-First-Century Strategy : An Introduction to Modern National Security Processes and Problems* (Maxwell Air Force Base, Ala.: Air University Press, 2006), 13-27.

Purists are disturbed by the concept of 'strategy' at the operational or tactical levels but this is based on a key idea. Sound strategy could align from levels 1-4 and still be lost by *decisions* made *on approaches* to specific battles.[520] Conversely, the majority of battles can be won with sound level 5 approaches and yet lose the war at level 3 or be unable to account for poor political judgment at level 1.[521] Thus, it is not diluting terms to think of strategizing happening at multiple levels integrated across scales of organization.

In business, this is roughly analogous to Pfeffer and Sutton's "knowing-doing gap" and the newer business discourse on strategic alignment via project management. A sound higher-level strategy is meaningless without proper alignment and execution of lower level strategies. In the same way, Drew and Snow view the levels as *a whole strategy process* made of, "a series of interrelated decisions [across levels] rather than a group of loosely related planning events."[522]

Drew and Snow's use of the word 'strategy' at the lower levels is also internally consistent with their overall definition of the strategy process as "a plan of action that organizes efforts to achieve an objective." Further, they are clear that while this process may have once happened in the mind of a single warrior king, "strategy is now made by different people or groups at different levels of authority, with often very different perspectives on what can or should be done."[523] The evolution of the five levels also supports their view of a common strategy process simply being expanded by virtue of new scales of organization.

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[520] Liddell Hart, *Strategy: The Indirect Approach*, 24.
[521] Williamson Murray, "Military Adaptation in War (IDA Paper P-4452)," in *IDA Papers*, ed. Institute for Defense Analysis (Alexandria, VA: Institute for Defense Analysis, 2009), 1-33.
[522] Drew and Snow, *Making Twenty-First-Century Strategy: An Introduction to Modern National Security Processes and Problems*, 26.
[523] Ibid., 13.

Strategy in its most basic form is a hypothesis about how to succeed. This conceptualization about how to succeed happens at different levels of organization. This simplified form of strategy allows us to see why the subject gets transported from the football field to the battlefield; from Wall Street to Main Street. Whether someone is leading a campaign into Afghanistan or taking over EBay they have this one thing in common: they both must engage in a cognitive process of hypothesizing about how to succeed in a large enterprise. Undoubtedly, comparisons among the disciplines can be hazardous. There is no way to compare losing a State Championship, 20% market share or 1,000 men in battle. Yet if the comparison is made in principle, this one thing unites everyone who embarks on a large-scale enterprise: they must develop a future-based theory about how to succeed.

The levels of strategy debate matters because it appears the model occurs at other levels of strategy like a fractal. Consider grand strategy in the Cold War. George Kennan relied on multi-disciplinary theory, highlighting the history and ethnography of Russia in his "Long Telegram." He also explored the Russian psyche, which he viewed as a mix of nationalism and neurosis to spur aggression. Kennan then relied on notions of siege warfare in his "X Article," turning to general theory to help construct a strategy that would take into account Russian characteristics and prevent the Soviets from expanding.[524] That concern led to a policy of containment, though Kennan was not pleased that the military instrument of power dominated that approach. Nonetheless, the containment concept was the paradigm that endured the administrations of nine Presidents. After the Korean War, the Domino Theory became one specific theory of

[524] Siege warfare on land, naval blockades at sea, and economic sanctions all have similar logic which is, to win by constricting resources or movement.

action that appeared under the umbrella of containment and that theory supported American involvement in the Color Revolutions as well the Vietnam War—the ways to prevent the dominos from falling (see figure 14).

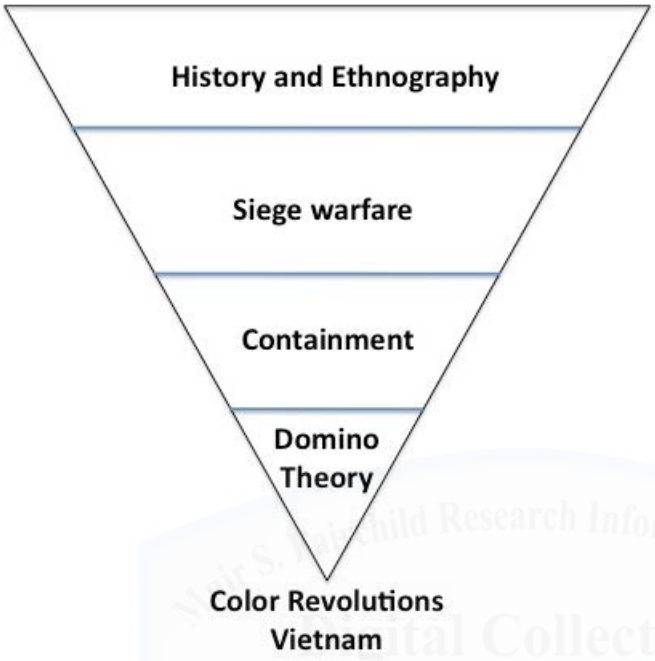

Figure 14: The Upstream Model for Domino Theory

It appears that this model is like a fractal that can be found in different professions (e.g. Apple) and different levels of strategy (e.g. containment). This serves as a further assurance that the simplified Upstream Model captures what is happening in the theory-strategy nexus. By themselves, the levels do not explain everything that is happening in strategy formulation (c.f. Figure 2) because this work shows it is the novel combination of those levels into supposition that yields potential insight and a source of military advantage.

CHAPTER 6
CONCLUSION

While there are many influences on the selection of ways in strategy, few are so squarely under the control of the strategist than the theory that provides the logic of how to use means to achieve ends. To honor the gravity of strategy on the affairs of nations, basic aspects of sound conjecture must be clarified like the meaning of ways, the role of guessing in strategy, and the layers of theorizing needed for a sound hypothesis. Further, while the importance of both continuity and change in warfare is well established, how to blend the two is not. There is at best an excessive focus on one or the other—at worst a random one—leading to no clear mechanism for understanding how to actually blend the nature and character of war when selecting ways for strategy. Even the act of creating theories of action seems like paving new ground by making them a formal object of research.

In developing strategy, theory shapes the selection of ways according to a certain structure that is captured in the model. These four levels—multi-disciplinary, general strategic, paradigms, and theories of action—can complement one another, and help provide the rationale for the strategy ultimately chosen to resolve a national security problem. Logic combines across the levels to provide a pathway for the power of ideas to shape conclusions about what winning looks like. The case studies do not indicate how much theory shapes our ways in any one context. Nor can the evidence provide a comprehensive catalog of all concepts at play in constructing a particular strategy. One cannot be dogmatic about which category each concept falls within or even the labeling convention that comprises the Upstream Model. What the evidence does show is how

multiple spheres of theory typically combine to provide the logic strategists need to apply the means in distinctive ways to help accomplish the desired political ends.

Airpower strategy provides just one lens to view how the Upstream Model worked in the World War II and post-Cold War eras. In the case studies examined, the creation of air strategy did not occur in one monolithic location. Airmen did not formulate strategy from one mindset, one school of thought, one coherent organizational process, nor did they rely on one method. Nevertheless, in the diverse and often unpredictable ways that strategy is actually made, all strategists relied on—or wrestled with—theory at multiple levels (see table 4).

Table 7: Airpower Examples of the Theory-to-Strategy Model

Name	Multi-disciplinary theory	General strategic theory	Paradigms	Theory of action	Ways
Industrial Web	Industrial engineering, macroeconomics, history, physics	Principles of war, systems approach, indirect approaches, cumulative strategy	Strategic bombing	Industrial Web	War on the sub-pens, dam buster raid, oil production attacks
Morale Effect	International relations theory, psychology, just war ethics	Total war, military coercion vs. annihilation	Strategic bombing	Morale Effect	Hamburg, Dresden, Japan fire bombing, Atomic bombing
Enemy as a System	Power vacuums, statecraft peace plans, ethics, geopolitics	Centers of gravity, strategic paralysis, asymmetry, enemy isolation	Strategic attack	Enemy as a System	5 Rings Model, parallel warfare, will-of-the leader focus, EBO
Crony Attack	Liberal institutionalism, coercive	Schelling's compellence, Schlesinger	Strategic attack	Crony Attack	Op Matrix, CENTCOM Matrix, 3M

	diplomacy, CNN-Effect, casualty tolerance, power theory, power vacuums	Doctrine, asymmetry, cumulative strategy			Strategy, covert ops, pseudo 5-Rings approach

In general, strategists transfer value from multi-disciplinary and general strategic theory. They need to approximate—and make assumptions about—a wide range of reality and unknowns. This in turn, leads them to consider a wide variety of strategic concepts apart from the classics of military and airpower theory.

Paradigms have provided mixed value to strategy. The strategic bombing paradigm provided some value to strategists in World War II, yet it did not completely suffice as a guide for Desert Storm. Shifting toward the strategic attack paradigm produced the normal angst that Thomas Kuhn has associated with paradigm shifts. In OAF, only certain aspects of the strategic attack paradigm could be transferred, but the emphasis on multidisciplinary theory (coercive diplomacy) from the National Security Council and State Department curtailed the full application of the paradigm. Still, the paradigm provided value in enabling the notion of Crony Attack.

Tailoring theory to suit the changing character of war occurred most at the theory of action level. Industrial Web Theory, Morale Effect Theory, Enemy as a System, and Crony Attack required imagination and "intuition in touch with experience" to match the concepts to the character of each war. In the World War II examples, the theories of action had long incubation and testing periods. In Desert Storm, airmen developed a theory of action right in the middle of the strategy development process. Similarly, in OAF, planners created one set-piece theory of action—Crony Attack—in near-real time after the "try-and-see" phase of coercive diplomacy failed (a process that remains

appropriately secret). Strategy students should understand that building a theory of action is a normal part of formulating strategy and how they do so is hypothesis. A specific theory of action must suit each situation, relying on timeless and timely concepts that sync with each context through informed conjecture.

Numerous strategy development methods exist, and many of them have common steps, but there appears to be a lack of consensus about which method is dominant in the craft.[525] Methods offer a procedure—some stepwise approach—for creating a strategy before proceeding to planning for implementation in operations. When handling something as weighty as American grand strategy, or simply when a crisis hits, having a straightforward framework that fuses all relevant theory only makes sense. This model could fulfill that purpose.

Describing the theory-strategy nexus could also have implications for fundamental aspects of strategy tradecraft: defining, making, and teaching strategy. For defining strategy, the history of defining "ways" and re-thinking the definition of strategy itself offer a different approach to crafting strategy. Being clearer about the meaning of ways could lead students and practitioners to isolate the concept-logic aspect of strategy. Also, using a theory-based definition of strategy promotes a focus on the power of ideas found in the realm of theory. For making strategy, the model in this research begs questions about a range of issues. Are practitioners clear that they will tailor theory to blend the timeless and timely aspects of strategy? Can a small twist in theory lead to the difference between nation-wide conflict in Afghanistan versus crushing a terrorist cell?

[525] Paul Maykish, "Strength in Ways: Finding Creativity in Routine Strategy Development" (Maxwell AL: School of Advanced Air and Spacepower Studies, 2011), 97-114. Twenty-one different methods across professions are compared to assess common steps between the methods.

Is a paradigm helping or hurting the strategist? These are essential questions that can be clarified by better understanding the theory-strategy nexus. Finally, for teaching strategy the model can help frame a different way to approach strategy education. Altogether, impacting how we define, make and teach strategy represent key frontiers for advancing the power of ideas by clarifying the theory-strategy nexus.

Defining Strategy

Two notions from strategic theory have tended to obscure the theory-strategy nexus. First, the meaning of the term "ways" is critical to strategy but its meaning has been ambiguous in the literature. As described in the introduction, the definition of ways has been far from singular and can be confusing to strategy students. At the same time, the ends-ways-means framework has become central to the DoD lexicon. This research highlights that ways are *a blend of concept and action directing how means are used to achieve ends.* Three sources point to this definition of ways: the case studies, the usage history of "ways" outlined in the introduction, and Richard Rumelt's description of "coherent actions."

In the World War II and Warden case studies, ways were consistently shown to be a unique blend of concept and COA. England developed an elaborate way to destroy the Ruhr Valley dams (COA) *because* of Barnes Wallis' theory that hydro-electric power represented a form of electricity generation that could not be dispersed (concept). The United States found a way to atomically bomb Japan (COA) for numerous *reasons including* that a D-Day styled invasion aimed at Japan would be too costly in American lives (concept). In ODS, Warden's team found a way to achieve leadership paralysis

(COA) *because* only enemy leadership could make concessions to coalitions forces (concept). In OAF, strategists found a way to pressure Milosevic's oligarchs (COA) *because* they were key to Milosevic's power structure and susceptible to crony attack (concept).

Defining ways as a blend of concept and action is also consistent with the usage of the word in the American strategic lexicon. In the introduction, a spectrum of word usages appeared that emphasized the "concept half" of ways while others stressed the "action half." Without both, the meaning of ways can be misleading. If COAs are presented without theory, commanders may have difficulty constructing missions aligned to the intent. For example, Short felt constrained in his implementation of air strategy in part because he was not really told how coercive diplomacy shaped his tasking. On the other hand, if ways appear only in concept form, commanders may choose a plan of action that cannot achieve the results sought. In Desert Storm, Horner could not visualize Warden's leadership targeting concept in a concrete manner.

Richard Rumelt's classic work *Good Strategy, Bad Strategy*, argues that all good strategy starts with a "kernel" which consists of a diagnosis, guiding policy, and coherent actions. Inherently, Rumelt's description of coherent actions exemplifies the blended definition of ways. Coherency stems from concepts, and actions are their logical extension. Coherent thought that does not lead to action is fruitless. Action that lacks cogency is aimless. Thus, in characterizing coherent actions, Rumelt also points to the meaning of ways as *a blend of concept and action that directs the use of means to achieve ends*.

A second aspect of this research for defining strategy is the importance of not leaving the theory component to chance. One may agree easily enough with the Army War College model that strategy is the ways we use means to achieve ends. Yet, if a strategist were asked, "what is your basic argument," then one explores what *precedes* the selection of ways after the diagnosis stage of design. Why is the theory of a strategy so often left to chance? One reason could be the vast majority of strategy definitions do not underscore of the importance of theory for conjecturing about what to do. Exceptions to this rule are found in the theory-based definitions from Brands, and loosely in Posen and Cohen (see Appendix 1, Selected Definitions of Strategy). Yet most definitions do not focus on the theory that lends logic to the selection of ways. Thus, normal definitions of strategy obscure the critical role of theory in strategy making.

The National War College, for example, defines strategy as "the ways in which means are orchestrated to achieve desired ends."[526] This succinct description reveals the ends-ways-means framework in a nutshell. However, such definitions do not *inherently* draw a student into *the logic that precedes* the selection of ways or, the argument of the strategy. Since this research indicates the preponderance of such logic comes from examining various levels of theory, adding that process to the definition of strategy would draw practitioners to being intentional about doing so (independent of what methods are used). This research points to strategy as *the theory-based argument for selecting ways in which means are orchestrated to win in a specific context*. This definition leads strategists to evaluate theory and tailor it according to existing contexts as they guess

[526] Definition of strategy from Course 6200, "War, Statecraft, and the Military Instrument of Power," 1 October 2014.

about how to win.[527] Once grand ends are debated and selected, the work of the practical strategist is developing a successful theory of victory that drives ways and means downstream from the theory to achieve those ends.

Another related issue is basic confusion over the essential elements of a strategy. Worse, civilian strategists and military strategists do not necessarily use the same terms for charactering these essential elements of a strategy. Using a theory-based definition of strategy allows us to bridge the different conceptualizations of these elements as follows.

At the most basic level, good strategies are good arguments.[528] A complete strategy argument covers "the 6Ws"--who, what, when, where, why, how—and adds a theory of the case, sometimes called a theory of victory that tells readers how winning is likely to work. The purpose of the argument and 6Ws are broadly explained by having clear theory, scope, and content. The theory of victory and 6Ws can be mapped to other familiar strategy terms.

[527] Moreover, the strategist must also realize that the domestic and/or international context can, on occasion, completely eclipse considerations of theory and cause political leaders to select ways without any concerns for the insights that theory might provide about a situation. While this prospect should be a rarity, the strategist must never forget that it may occur.

[528] Richard Rumelt mentions this idea in passing, *Good Strategy, Bad Strategy*, p. 77. Strategy "is coherent action backed up by an argument, an effective mixture of thought and action with a basic underlying structure I call the kernel."

Table 8: An Argument with 6Ws

Purpose	**Questions**	**Strategy dimension**
Theory	Argument?	Theory of victory
Scope	Where?	Area
Scope	When?	Timeframe
Scope	Who?	Scale or organization level
Content	Why?	Ends
Content	How?	Ways
Content	What?	Means

Clear scoping answers the where, when, and who questions. Keep in mind the levels-of-strategy problem. These scope answers may come from higher levels of intellectual debate (such as grand strategy) since the scope questions are just as strategic in nature as the strategy content that follows. In this case, these scope questions should be derived from the mandate or impetus that drives the strategy making process. In practice these terms match with area, timeframes, and scales of organization. *Area* can be geographic or functional and answers the "where" question. Geographic strategies can run from one country like Russia or a region such as the Middle East. Functional areas cover subjects that transcend geography like cyberspace strategies, countering weapons of mass destruction (C-WMD), or information operations. *Timeframe* answers the "when" question for a strategy (e.g. one year vs. 25-year strategies). *Scale* is the level of organizational at which a strategy takes place and answers the "who" question about a strategy (i.e. from small to large scale—from a single organization strategy up to grand strategy). Combining these three aspects of scope, one can orient to the various kinds of

strategies such as Western Hemisphere, cyber, or terrorism strategies (area or where); 5, 10, or 30-year strategies (timeframe or when); and business, national, departmental, regional command, or service strategies (scale or who).

A theory of victory is required to add coherence to a strategy. If there happens to be a higher-level theory of victory that explains the logic of the scope, Table 8 can still be used as a basic checklist to ensure there are no gaps in the logic. Is there an argument and how good is it? Is the level of strategy clarified (who)? Is the intended timeframe of the strategy clear (when)? Is it clear where this strategy applies either geographically or functionally (where)? In many scenarios, there may be a sense of who, when, and where but a clear theory of victory is lacking. Thus, your level of organization may still require a clear argument about how to "win" across the time, area, or scale in question (the scope) if it is not presented from the higher levels of organization.[529]

At your level of organization, the argument will explain the logic for selecting ways in which means are orchestrated to achieve the desired ends of winning if that theory is not provided by higher-level guidance. As previously indicated, the supposition takes the form of a hypothesis or theory such as a theory of victory (war), theory of the case (law), theory of the business (management), mechanism of action (medicine), or theory of action at lower levels of organization. An argument in the form of a theory may

[529] In some cases, there may be a clear theory of victory that is already defining the scope and content questions for the strategist at the lower level of organization. In other cases, that may be a two-way process where actors are reasoning with each other across levels or organization. It may also be the case where there is no clear theory of victory at a higher level and the lower level strategists must either present an over-arching theory beyond their level of organization (as in the case of Desert Storm) or suffer the absence of the same (which history may judge was the case in Iraqi Freedom). It is also possible that higher-level guidance provides some clarity about the scope—or actors are fighting for that clarity—but leaves the theory of victory and strategy content itself to chance. In short, a strategist can find themselves in a myriad of situations and across various levels of organization. The strategist must simply sort out the level of theory development and upon what level or levels they are playing. Table 8 is not a bad place to start to check the completeness of theory development as it unfolds in real time.

be refined over time but we find them across different levels of organization like Europe First (WWII), Containment (Cold War), Roche/Marshall Strategy (end of the Cold War), Enemy as a System (Desert Storm), Crony Attack (Allied Force), the Afghan Model (early Enduring Freedom), Lines and Slices (Iraqi Freedom), and the "F3EAD" model (terrorism).[530]

As an argument takes shape using theory, it should add coherence to the content of a strategy by framing the why, how, and what questions. These questions correspond to the ends, ways, and means of a strategy in military parlance. The *ends* of a strategy answer "why" an organization is doing what it is doing. An end represents the future picture or, what we want the world to look like when the strategy is done.[531] The ends specify what winning looks like. *Ways* explain "how" a strategy will be done (see page 39 for a list of different techniques that capture the "how" function of a strategy). Ways add up to the elements or variables of action that, when combined, will plausibly lead an organization the end state. *Means* answer the "what" question as in, what is needed to make the ways happen. Means are not always things. Means could be DOTMLPF variables too (doctrine, organization, training, materiel, leadership and education, personnel, and facilities). In practice, means are really anything that answers the "what" is needed question as required by the ways of a strategy.

Altogether, having an operative theory and answering the 6Ws is fundamental to strategy and can happen across levels of organization. While these fundamentals are necessary for a good strategy, they are not sufficient. Having an argument and the 6Ws

[530] These theories of victory and the logic behind each is probably what Richard Rumelt means by the importance of a "guiding policy." A theory of victory is preferred terminology because it reminds all players this is about winning at some level rather than promulgating a guiding policy per se.
[531] This is a specific phrase used by John Warden in his post-military work, *Winning in Fasttime*.

simply adds coherence to a strategy but having an argument does not guarantee that it is a good one any more than all hypotheses in science are equally good. Having and theory of victory and the 6Ws squared away simply removes distractions so practitioners can focus on the insightfulness and plausibility of the strategy argument.

In sum, this broader view of strategy complimented by a theory-based definition could train practitioners in the basics of strategy-making which can be applied at *any* level of organization. What is common about any strategy independent of time, scale, or area? All of the case studies in this research show the importance having *a theory about how to "win"* with the ways that means are used to achieve ends across time, scale, or area. This broader view of strategy is enabled by a theory or logic-based definition.

A theory-based definition of strategy provides additional benefits. First, it encourages strategists to make their strategic logic more explicit with clear statements of rationale. Second, providing clear rationale for why a theory is valid for a situation makes testing that validity (and exposing weaknesses) easier compared with theories that are tacit or otherwise, unarticulated. Third, by pinpointing logic, strategists can accentuate the beneficial aspects of those theories that enlighten and minimize the detrimental aspects of those that blind. Fourth, a theory-based definition can provide a platform for "concept innovation" in developing new theories of action (to be discussed further). Fifth, emphasizing logic allows strategists to "reverse engineer" existing strategies by investigating the roots of any unstated theory supporting a strategy. Finally, a theory-based definition of strategy can assist strategists in analyzing and unraveling an

enemy strategy at the theory level of analysis, an action that Sun Tzu consistently encouraged.[532]

Making Strategy: The Changing Character of War

When making strategy, the danger of approaching the next war based on the theory of the last is generally known. What seems less clear is explaining how tailoring theory is a key part of ensuring that does not happen. Clausewitz's distinction between the nature and character of war is a central proposition about why theory matters so much. Yet this is a critical area where his work was not completed. We have not established how formulating theory is a mixture of general strategic theory from the nature of war and special theory from the character of war. Combining the two yields a complete theory. Defaulting to general theory may produce strategies ill matched to new phenomena. Developing special theories with no basis in general theory may lack the leverage that comes from ancient experience with the fundamentals of war.

As mentioned, the theory of action level is most active due to the changing character of war. As a result, one could look at this level in any given situation and ask, is there a clear theory of victory? The absence of a clear theory of action could reflect the absence of theory matching to the character of war. Also, the World War II case shows that a nation may need to shift between competing theories of action amidst war as the U.S. did between the European and Pacific theaters. Sometimes organizational resistance to change may be too great for new theories. In the example of the Dambusters Raid, this innovation had to happen outside of normal structures (i.e. outside Harris' bomber

[532] Sun Tzu (Samuel B. Griffith, trans.), *The Illustrated Art of War* (New York: Oxford University Press, 2005), 115, 3-4.

command). Further, if a paradigm is too restrictive, as it was for Warden and McChrystal, then it too may need to shift in the middle of strategy development (Warden) or war itself (McChrystal). A key finding of this research is how tailoring theory allows for blending the timeless and timely aspects logic in war to improve the outcomes through better matching with reality.

In addition to reacting to the changing character of war, is it possible for theory to proactively trigger its own change in the character of war? This was the case with the First and Second Offsets during the Cold War era. The First Offset was triggered by President Eisenhower's "New Look" analysis that included a cost-effective solution for bolstering deterrence credibility against the sizeable 175 Soviet army divisions. The First Offset changed "how we fight" by propagating tactical nuclear weapons of various species and organizational changes like the Pentatomic Division. The Second Offset was triggered in the 1970s by instability at the large-scale conventional level of war with NATO forces being outnumbered 3-to-1 against any Soviet aggression in Eastern Europe. The Second Offset changed how we fight by creating an advanced precision strike regime with the ability to conventionally find, fix, and finish anything in a 10,000 square mile area (i.e. precision guided munitions, stealth, global positioning satellites, Joint STARS, Joint Tactical Information Distribution System and the like). In both offsets, theory was not simply the means to react to the changing character of war, but was the proactive cause of that change. As an important distinction, the First and Second Offsets happened during Stephen P. Rosen's wartime rule sets.[533] The Third Offset has been triggered during a peacetime rule set. This is a key distinction to understanding when theory is

[533] See Stephen Peter Rosen, *Winning the next war: Innovation and the modern military*. Cornell University Press, 1994.

likely to play a proactive role in shaping the character of war (the existential wartime rule set), and when it is more likely to react to the character of war (the peacetime rule set like the post-Cold War cases).

Making Strategy: Minimizing What Theory Does to Us

A second implication for making strategy is finding a method to teach how to maximize what theory does *for* strategists and minimize what it can do *to* them. In the introduction, the work of Graham Allison and Philip Zelikow is used to underscore the power of theory.[534] In review, they asked "Do our theories shape the questions we ask, or the answers we get to common questions?" Their answer is "both."[535]

This insight leads to a simplified fractal that illustrates how to maximize what theory does *for* you and minimize what theory does *to* you. Allison and Zelikow demonstrated how pre-existing theory shaped the questions asked during the Cuban Missile Crisis. The questions, in turn, shape the answers derived (they say pre-existing theory is at play here too). The answers become the solutions from which we choose. Accordingly, the solutions become draft strategies. Then if, a strategy process is sound, several concepts combine to form an overarching theory of action that embodies the ways

[534] Graham T. Allison, and Philip Zelikow, *Essence of Decision: Explaining the Cuban Missile Crisis*. 2nd ed. (New York: Longman, 1999), 18, 143, 144, 257, 294, 379. Model 1 is The Rational Actor paradigm from authors Hans Morgenthau and Thomas Schelling. Model 1 is defined as consistent, value-maximizing choices within specified constraints that can be observed by looking at goals and objectives, alternatives, consequences and choice as calculations by leaders. Model 2 is the Organizational Behavior paradigm from author Max Weber. Model 2 is defined as outputs of large organizations on "autopilot" with their own inertia. Such organizational behavior is determined by routines established prior to that instance like norms and standard operating procedures that create "tendencies." Model 3 is the Government Politics paradigm from the author Richard Neustadt. Model 3 is defined as the political resultants from "games" with government "decisions" and "actions" that form "collages" of choices, minor games, central games and foul ups that are normal to group processes. All three models are used to organize the details of strategy decisions into "a limited number of causal strands that were woven into the most important 'reasons' of what happened" (p 379).

[535] Allison and Zelikow, *Essence of Decision,* 387.

for a strategy. The Theory-to-Strategy Model illustrates this key dynamic: upstream theory sets the boundaries within which ways are selected. To shape that parent theory is to alter the set of potential strategies that can develop downstream.

For example, thinking of what strategy does for strategists and to them, it is not a stretch to claim America and NATO are still in Afghanistan after 15 years in part due to theory. Part of Bush Doctrine was equating terrorists with those who harbor them.[536] That prescriptive theory drove basic questions like, who is harboring UBL? The answer

Table 9: Theory-to-Strategy Channelization in Afghanistan

Theory	**Questions**	**Answers**	**Solutions**	**Strategy**
Bush Doctrine which equated those who harbor terrorists with the terrorists	Who is harboring Usama Bin Laden (UBL) and Al Qaida (AQ)?	The Taliban	We should attack the Taliban and Al Qaida (vice just Al Qaida)	Nation-wide conflict with the Taliban (vice just Tora Bora to crush Al Qaida while surrounded)

to this question, still informed by the overarching theory, was the Taliban. Unfortunately, Pushtun tribal code (Pushtunwall) and Shari'a law prevented the leader of the Taliban, Mullah Omar, from giving up UBL.[537] The Taliban and AQ were two different organizations[538] but theory led Americans and their allies to fight both as a

[536] President Bush's address to the nation on September 11, 2001 included this language. [We will] make no distinction between the terrorists who committed these acts and those who harbor them." His September 20, 2001 address to congress amplified this aspect of Bush Doctrine. "We will pursue nations that provide aid or safe haven to terrorism. Every nation, in every region, now has a decision to make. Either you are with us, or you are with the terrorists."
[537] Antoine Sfeir, ed., *The Columbia World Dictionary of Islam* (New York: Columbia University Press, 2007), 253.
[538] Antonio Giustozzi, *Decoding the New Taliban: Insights from the Afghan Field* (New York: Columbia University Press, 2009), 33.

common enemy. The Taliban solution shaped an operation to bring the US Marines into Camp Rhino to attack the Taliban, followed by the US Army in force. US and NATO forces have continued to fight the Taliban to this day even though UBL was killed in 2011 (after his injury in, and escape from, Tora Bora in late 2001).

Dr. Tom Hughes from SAASS states this conundrum as, "Theory does things for you and to you." Expressed in haiku, theory can enlighten and blind. All theory should be understood as having this essential tension. To minimize the blinding work of theory, strategy definitions and instruction should force students to be explicit about their theories for selecting ways and understand the above channelizing potential of theory. To maximize the enlightening role of theory, students should be trained with a basic framework of how theory shapes ways along with the skill of how to create their own hypothesis.

From this research, some simple guidelines for maximizing the good of theory and minimizing bad come forth (see Table 10). There is one fundamental skill that has not been mentioned elsewhere and doesn't fit neatly in this list either: reading. It is a truism but, the more one reads the more dots one has for connecting across the levels of theory. Maximum exposure to theory and history inherently promotes maxing what theory does for you. When combined with existing hypothesis testing techniques, Table 10 is a condensed reference to highlight the theory-strategy nexus as a compliment to any other strategy development method.

Table 10: Maximizing and Minimizing Theory Impact

Maximizing what theory does for you	**Minimizing what theory does to you**
• Is the diagnosis of the situation satisfactory and insightful? • What is the theory of victory or, what is the basic argument here? This forces theorizing or reveals tacit theory. • Flesh out the changing character of war features: who is fighting, why, and how. This fosters intentional matching of timeless and timely aspects of theory to the context. • Draft a mini-argument for the plausibility of the hypothesis. Clear writing forces clear thinking. • Does your theory of victory incorporate all four levels of theory? Missing layers can lead to partial hypotheses. • Does the theory promote paradox for an enemy? Such questions follow Sun Tzu's advice to defeat the enemy at a	• Implement Irving Janis procedures on avoiding group think.[539] • Review Richard Neunstadt and Ernest May's *Thinking in Time* checklist to avoid misuse of history.[540] • Review common logical fallacies. • Review common biases in thinking. • Leverage the *Tradecraft Primer* to check assumptions in the theory of victory.[541] • Red Team draft strategies.[542] • Perform "ilities" testing on the hypothesis.[543] • Leverage "future proofing" of draft strategies.[544] • Does the current paradigm seem restrictive or ill matched for the situation? It may need to change while making strategy as in Desert Storm.

[539] Janis, Irving Lester. "Groupthink: Psychological studies of policy decisions and fiascoes." (1982).
[540] Neustadt, Richard, and Ernest May. *Thinking in time: The Uses of History for Decision Makers* (1986), appendix.
[541] "A Tradecraft Primer: Structured Analytic Techniques for Improving Intelligence Analysis." *CIA Center for the Study of Intelligence* (2009).
[542] See "The Applied Critical Thinking Handbook v7.0," http://usacac.army.mil/sites/default/files/documents/ufmcs/The_Applied_Critical_Thinking_Handbook_v7.0.pdf (accessed 1 July 2016).
[543] "Ilities" tests address specific qualities of a hypothesis. Where Table 8 in this study can be used for a completeness test, "ilities" test qualities or values like suitability, desirability, feasibility, acceptability, and sustainability. A good set of questions to assess these qualities can be found in the National War College syllabus, Course 6610, 2014.
[544] Future proofing derives from alternative futures or, scenario development techniques. Scenario Planning started at RAND in the 1950s. The contemporary progenitor is Peter Schwartz. See Peter Schwartz, *The art of the long view: paths to strategic insight for yourself and your company*. Crown Business, 1996. This book contains a checklist or disciplined method to derive plausible futures. Working backwards, such futures can inform strategy. Another way to use this method is testing an existing strategy. Once the scenarios are developed one can analyze, how would the strategy perform in each of these futures? Using Scenario Planning this way is called "future proofing" a strategy. The phrase itself makes a strong implication like, it is possible to create a strategy that works in all plausible futures—that is a good ambition.

strategy level first, before fighting ever begins. • Does the theory turn an adversary's strategy "red"? This leads a group toward unraveling adversary strategy. • Is there content in the theory that seems, both clever and plausible? Creativity is not a measure of merit but cleverness should be sought within reason. • Have we ensured that political restrictions have not crushed creative hypothesizing? Crony Attack occurred between very narrow political rocks. • Have we included people who are natural at theorizing in an open planning structure (among other specialists)? • Have we allowed for thinking at levels of organization above our own as required by the situation? Desert Storm thinkers even drafted their own peace plan before the war.	• Does the hypothesis for the strategy make the endstate seem plausible? "And those who harbor them" seemed reasonable in 2001 at first glance, but the long-term proposition of Taliban regime change was unchallenged.

Making Strategy: Unrealized Strategy

Henry Mintzberg characterized such strategic variance with a 5-part typology in *The Rise and Fall of Strategic Planning*. He contended that five forms of strategy interact: intended, deliberate, unrealized, emergent, and resultant (see Figure 6). A *deliberate* strategy is an *intended* strategy that becomes fully realized in practice. *Unrealized* strategies are ones that fail to be implemented. They do not reach the deliberate stage. An expanded definition of unrealized strategies could also capture those that are undiscovered (potential) strategies—the ideas never born or the roads not taken. *Emergent* strategy conforms to a pattern not originally intended (for better or for worse).

The melding between deliberate and emergent strategies creates the *realized* strategy that is actually being pursued.[545]

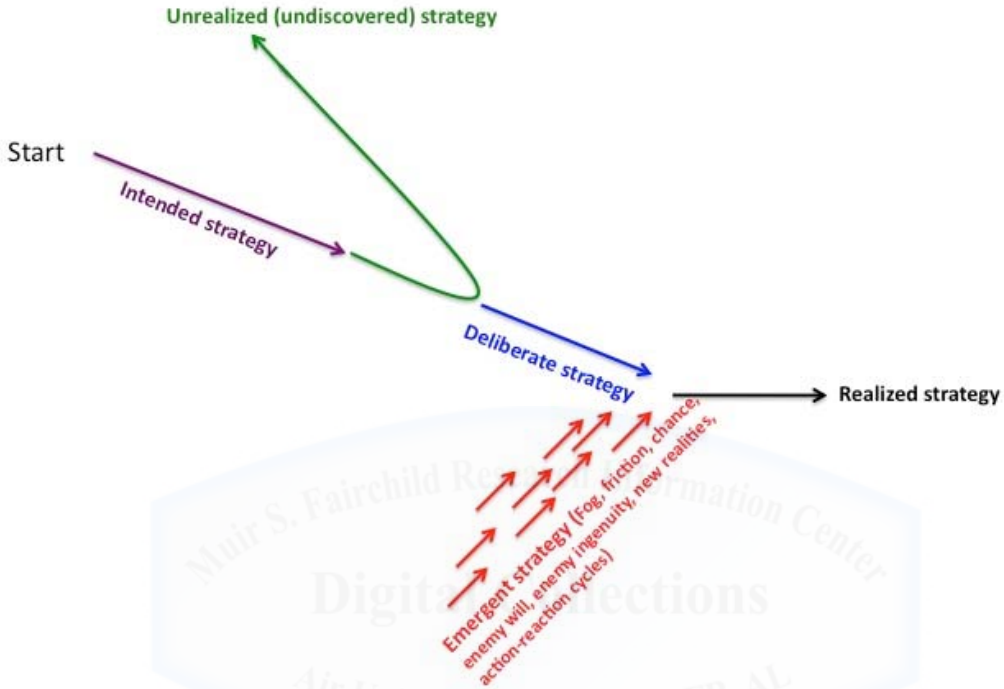

Figure 15. Strategies Deliberate and Emergent, adapted and reprinted with permission (Source: Mintzberg, Henry, Bruce W. Ahlstrand, and Joseph Lampel. *Strategy Safari: The Complete Guide through the Wilds of Strategic Management*. 2nd ed. Harlow, UK: FT Prentice Hall, 2009, 12).

This rich picture captures the life cycle of the strategy process to include the roads not taken. The creative theories of action in this research beg the question about how we ensure we have not missed a better strategy. Using this graph one could also argue this:

[545] Henry Mintzberg, Bruce Ahlstrand, and Joseph Lampel, *Strategy Safari: Your Complete Guide Through the Wilds of Strategic Management*, 2ed (Harlow UK: Prentice Hall, 2009), 12. The role of emergent strategy led Mintzberg to claim strategy ends up being more about *formation* from context than conscious *formulation* from strategists. Why this contention may be true will be explored further in conclusions. These five forms of strategy apply to practice in numerous ways. For one, sometimes there is a more direct line between intended and realized strategy. In other examples, emergent strategies may dominate via the Clauswitzian forces of fog, friction, and chance (always present but can vary in intensity). For more information on Mintzberg's view see Mintzberg, *The Rise and Fall of Strategic Planning: Reconceiving Roles for Planning, Plans, Planners*, 24-26.

when theory has a better match with reality, the "intended" to "realized" path is a straighter line and emergent realities have less impact because they were somehow captured by the theory of the case.

Due to the incremental nature of coercive diplomacy in OAF, the pathway between intended and resultant strategy was less direct than, say, the path for those two strategy types for conventional war in Desert Storm. Desert Storm had its surprises like SCUD missiles, but the ways selected to guide the air campaign paralleled the intended strategy of the Instant Thunder plan. OAF involved bigger "mid-course corrections" due to a false assumption that Milosevic would fold sooner than he did.[546] As noted in the introduction Figure 2, there are always other influences on ways. In the case of Kosovo for example, Supreme Allied Commander for Europe, General Wesley K. Clark, was left out of the strategy development process with the Chairmen of the Joint Chiefs of Staff, Secretary of Defense, and President.[547] Such political matters can also alter the roads not taken. In the end, the subject of unrealized strategy happens upstream in the realm of theory. The more theoretical a strategic endeavor becomes, the more likely it is to uncover what would have otherwise been a sound, but undiscovered, approach to achieving the desired endstate.

Making Strategy: Paradigm Lost

[546] Greg Schulte, "Revisiting NATO's Kosovo Air War: Strategic Lessons for an Era of Austerity," *Joint Forces Quarterly*, 71 (4th Quarter 2013), 15-16. Greg Schulte notes three reasons why the short-war assumption was flawed. First, US officials based this assumption on past experiences of dealing with Milosevic. Second, policy makers may have drawn the wrong lessons from Operation Deliberate Force in 1995 over Bosnia. Three weeks of bombing in 1995 in concert with a large-scale Croat ground offensive, brought Milosevic to the negotiating table. But Kosovo was a more vital interest to Milosevic [and Kosovo had sacred value in Serbian history]. Third, perhaps subconsciously, the short war assumption eased the political decision to intervene.

[547] Wesley K. Clark, *Waging Modern War* (New York: Public Affairs, 2001), 220.

The intellectual history of WWII theories compared with the post-Cold-War era paints a picture of missing a potential paradigm shift. Thomas Kuhn popularized the phrase "paradigm shift" with his works *The Structure of Scientific Revolutions* and *The Essential Tension*. There are two main ideas in his works that apply generally to concept modeling. First, changing theory is accompanied by a normal tension between old ideas (traditional science) and new ideas (revolutionary science). Kuhn calls this the "essential tension." Second, these changes often occur when an "anomaly" discounted by the old paradigm is recognized by revolutionary thinkers of the new paradigm. An anomaly is defined as "the recognition that nature has somehow violated the paradigm-induced expectations that govern [the old paradigm]." Then, progenitors of the new paradigm "more or less extend exploration of the area of anomaly." The previously ignored/unobserved anomaly contains insight that begins a shift toward a new paradigm.[548]

Kuhn taught that there are five signs of a paradigm shift. The insight forming the new paradigm:

1. Provides a substantially new perspective on problems and solutions
2. Inspires new questions about old data
3. Changes the rules of the subject
4. Alters the conceptual map directing further experimentation
5. Moves a community of practice beyond the mere clean-up work ("normal science" and "puzzle-solving") of perfecting the old paradigm[549]

[548] Kuhn, *The Structure of Scientific Revolutions*, 52-53. Kuhn's description of a paradigm shift touches on the fact-theory distinction in the philosophy of science. For Kuhn, there is ample evidence that the fact-theory description is "exceedingly artificial" and that "its artificiality is an important clue to several of this essay's main theses" (p 52). This also connects to Steve Johnson's work *Where Good Ideas Come From: the Natural History of Innovation*. Johnson explains how all new ideas happen through the collision of existing ideas that are "adjacent" to each other. Johnson then characterizes seven ways adjacency works to create new ideas. One could argue that Kuhn also touches on adjacency when he describes how members of the old paradigm connect with a new idea in an anomaly that is "adjacent" but ignored or unexplored.
[549] Kuhn, *The Structure of Scientific Revolutions*, various: *Changing the rules*, 40, 41, 52, 175; *Changing the direction of new research*, 109 and 111; *Altering perspectives*, 111 and 121; *Questioning old data*, 139 and 159; *Moving beyond paradigm clean-up*, 37 and 144. Source note: the author contributed to the

Paradigm shifts to new models of practice occur along a spectrum from minor, major, or complete shifts according to the intensity of change in these five signs of shift. These five signs are useful criteria to judge the state of a paradigm shift like that of strategic bombing to strategic attack.

Anomaly and paradigm shift are also useful to understand a potential paradigm shift that was missed inside the Air Force. World War II presented a large set of additional "ways" in airpower strategy that did not fit neatly into either the Industrial Web or Morale Effect theories. There are four salient examples. First, Jimmie Doolittle's raiders were volunteers flying modified B-25s off the deck of the *USS Hornet*. They were to fly a one-way trip over Japanese cities and land in China. Fearing Japanese reprisals, Chiang Kai-shek was not pleased with the plan. The carriers triggered Japanese early warning and Doolittle's Raiders had to take off 200 miles early but they made the mission happen with substantial chaos. [550] In the end, the intent of Doolittle's Raid on Japan was more about one-time reprisal or strategic communications rather than achieving any lasting industrial web or morale effect objectives.

Second, the Japanese mastermind of the Pearl Harbor attack—Admiral Isoroku Yamamoto—was killed in an air-to-air mission. A major, ironically with the last name Mitchell, led a flight of 16 P-38s departing from Guadalcanal to intercept Yamamoto in the air while returning from an inspection of his fleet in the South Pacific. The flight spotted two bombers escorted by six Japanese Zeros. In the aerial combat that ensued,

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Wikipedia entry on "The Structure of Scientific Revolutions." Thus, there is a resemblance to the opening paragraph of that entry and this description of Kuhn's signs of a paradigm shift.

[550] Geoffrey Perret, *Winged Victory: The Army Air Forces in World War II* (New York: Random House, 1993), 150-153.

1Lt Rex T. Barber shot down the bomber carrying Yamamoto on April 18, 1943.[551] One of Japan's esteemed strategists and the mastermind of the Pearl Harbor raid was found, fixed, and finished by an Lt on an airpower mission. This mission was a military version of what Bob Pape called decapitation.[552] This general strategic theory does not refer to the barbaric severing of a head, but the strategy of attacking an enemy's leadership when doing so is proportional.

Third, the Allies were concerned about the Germans developing the atomic bomb. Numerous efforts to break the chain of A-bomb development included sabotaging the Germans heavy water plant in Norway.[553] The Allies decided to bomb the facility. On November 16, 1943, the plant was heavily damaged by 143 B-17 dropping 711 bombs on the heavy water plant. This attack combined with attrition from all previous sabotage attacks, led the Germans to move heavy water production back to the fatherland and delay atomic weapon production.[554] This attack was less about a bottleneck target in the industrial web and more about time sensitive targeting and pre-emption.[555]

Fourth, the bombing of Pas De Calais, France to fool the Germans about the D-Day landing location fell under Operation Bodyguard—a D-Day military deception (MILDEC) operation. The Army Air Force's component of Bodyguard—Operation QUICKSILVER-IV—called for extensive bombing of targets in and around Pas de Calais, France. The Allied objective was to seal off the Germans in Pas de Calais so they

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[551] Kit C. Carter and Robert Mueller, *Army Air Forces in World War II: Combat Chronology 1941-1945* (Washington DC: The Center for Air Force History, 1991), 123.
[552] Robert A. Pape, *Bombing to Wing: Air Power and Coercion in War* (Ithica: Cornell University Press, 1996), 56, 79-80.
[553] Knut Haukelid, *Skis Against the Atom* (Minot, North Dakota: North American Heritage Press, 1989).
[554] The Official Website of the 392nd Bomb Group, http://www.b24.net (accessed February 20, 2015).
[555] In 1981 the Israeli's performed strategic attack on Iraqi nuclear capes and the U.S. followed suit in 1998, during Operation Desert Fox. These were not industrial-web-inspired attacks but rather, time-sensitive, pre-emptive targets.

could not reinforce Normandy. It was also thought bombing would have the dual purpose of persuading the Germans this was being done to prepare for a cross-channel invasion *at* Pas de Calais—the closet landing point from England.[556]

Doolittle, the Yamamoto kill, D3 plant bombing, and D-Day MILDEC do not fit neatly into the strategic bombing paradigm. Nor do other unique airpower expressions like the anti-submarine warfare in the Atlantic or the Berlin Airlift fit neatly into the strategic bombing paradigm—the one often used to explain air power in World War II. Is it possible that these examples could have been "anomalies" that represented an unarticulated *service*-level paradigm?

Recall that John Warden began working on the 5 Rings Model in response to a task to explain the role of the USAF in national security. As recently as 2008, both the Secretary of the Air Force and the Chief of Staff of the Air Force attempted to articulate a new model called "Sovereign Options." The Sovereign Options model was most clearly articulated in General John Jumper's posture statement in 2008. A Strategic Studies Quarterly paper by the Hon. Michael W. Wynne, Secretary of the Air Force, followed Jumper's posture statement.[557] The following propositions borrow heavily from both documents and bear a strong resemblance to the "other" anomalies at work in World War II. Sovereign options:

1. Refer to the spectrum of choices for solving immediate problems that air, space, and cyberspace capabilities can reach (c.f. Norwegian D3 Plant).
2. Recognize that in war, much is not a matter of choice. This makes many applications of sovereign options unforeseeable (c.f. Yamamoto Air-to-Air Decapitation).

[556] Roger Hesketh, *FORTITUDE: The D-Day Deception Campaign* (New York: Overlook Press, 2000), xi.
[557] Michael W. Wynne, "Sovereign Options: Security Global Security and Prosperity a Strategy for the United States Air Force," *Strategic Studies Quarterly* (Spring 2008), 11.

3. Allow for immediate adaptations to the behavior of the enemy or the fog, friction, and chance common to war based on the speed, precision, persistence, and global reach of aircraft (c.f. Berlin Airlift).
4. Project power or implement strategic messaging with the ease of moving a squadron of F-22s into a region or conducting a global strike mission with limited and well defined ends (c.f. Doolittle Raid).
5. Refers to the asymmetric advantage the United States possesses in air and space technology to *create* problems vice react to them (c.f. Op Fortitude South military deception (MILDEC) bombing).
6. Concludes, like Plato, that only the dead have seen the end of war. To be ready, we must have the "strategic depth" on hand to shape the conditions of conflict as they arise (c.f. emergent anti-submarine warfare in the Battle for the Atlantic).

The general match between the World War II anomalies described above and the elements of this (old) draft model to explain the independent USAF seem to indicate evidence for this 2009 attempt at a paradigm articulation existed as far back as World War II.

Is it possible that these "other" airpower COAs in World War II represent "anomalies" that were not fully explored after World War II? Does the general match between the airpower actions above and the un-established Sovereign Options paradigm show that actions can *reveal* theory as much as they *proceed* from theory? Going back to the period of World War II, one might call the anomalies "discoveries" to the strategists who were wielding the air weapon. If action is theory laden, perhaps it can reveal theory even when the theory is unclear or un-articulated. Action can reveal new theory as much as it demonstrates existing theory. Thus, the levels of theory *drive* strategic choices as modeled in the strategic bombing paradigm, but they also appear to *reveal* an unarticulated theory as in the match to Sovereign Options before that paradigm was articulated.

The Sovereign Options paradigm was by no means fully visible in World War II—nor is it popular today; yet that is not the point of this synthesis about paradigms lost.

The Desert Storm case study presents evidence about strategists who recognized a paradigm shift was taking place and did their part to advance it. Doing so created asymmetric advantage over an enemy. These Sovereign-Option-like examples from World War II are simply presented as conjecture of what overlooked anomaly may look like when strategists fail to recognize paradigm changes of their day. As discussed in the Desert Storm example, Khun called this phenomenon an invisible revolution. Like the atom, some important reality is long present but only becomes visible with a change in perspective. The invisible revolution dynamic is yet another reason strategists should be aggressive theorists to gain advantages using previously unobserved factors.

Making Strategy: Concept Innovation

A fifth impact on making strategy pertains to understanding how concept innovation happens. Throughout the cases, strategists developed new strategic concepts *because* they were actively theorizing. Enemy as a System, Crony Attack, the Afghan Model and F3EAD all represent examples of consciously harnessing advantage through the power of theory. Rumelt wrote, "The creation of new strengths through subtle shifts in viewpoint. An insightful reframing of a competitive situation can create whole new patterns of advantage and weakness. The most powerful strategies arise from such game-changing insights."[558] In the context of this research, theory and hypothesizing about the development of ways may be a solid framework for teaching the development of "insightful reframing" or creativity in strategy. One could argue the degree to which theory was altered in the cases is the degree to which that strategy could be called

[558] Rumelt, *Good Strategy, Bad Strategy*, 10.

innovative and effective. The Dambuster Raid in World War II was a departure from the norm in Britain and to great effect. Warden shifted a paradigm right in the middle of strategy development. Kosovo strategists reframed to find a way to win with Crony Attack in the most narrow of political conditions.

The Upstream Model can serve as a bridge from strategy to the burgeoning subject of "innovation theory." In the 1990's, the field of innovation theory took off in the Silicon Valley with the rise of innovation organizations like IDEO.[559] The question of *how* to innovate matured into a field of study. Today, there are communities of practice (Innovation Excellence), consortiums (Global Innovation Management), a continuous stream of new literature,[560] and certifications in innovation management (IXL Institute). Using the Upstream Model can serve as a bridge from the subject of strategy by considering three basic concepts in innovation theory: the intersection of ideas, what happens in the intersection, and structuring the intersection of ideas in practice.[561]

First, Frans Johansson illustrated how innovation happens at "the intersection." In *The Medici Effect: What Elephants & Epidemics Can Teach Us about Innovation*, he noted, "The intersection of fields, disciplines, or cultures, [combines] existing concepts into a large number of extraordinary new ideas."[562] This intersection is named after the Medici family from Florence, Italy who were avid

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[559] Tom Kelley, *The Art of Innovation: Lessons in Creativity from IDEO, America's Leading Design Firm* (New York: Doubleday, 2001), 1-5.
[560] For the latest example see Gary P. Pisano, "You Need an Innovation Strategy," *Harvard Business Review* (June 2015).
[561] As mentioned on page 168, William Duggan made the observation that strategy and creativity literature exist in two different discourses that should be bridged. This implication is related: how do we bridge strategy and "innovation theory" which currently exist as two different subjects?
[562] Frans Johnansson, *The Medici Effect: What Elephants & Epidemics Can Teach Us about Innovation* (Boston: Harvard Business School Press, 2006), 2.

multi-disciplinarians. One could argue the Upstream Model is a picture of the intersection as strategists tailored new theories of action for their situations.

Second, journalist Steve Johnson studied in effect what is actually transpiring in the intersection. Johnson pulls together the concept of "adjacency" which is how one idea enables the discovery of adjacent ideas. "The adjacent possible is a kind of shadow future, hovering on the edges of the present state of things, a map of all the ways in which the present can reinvent itself… Good ideas are not conjured out of thin air; they are built out of a collection of existing parts…"[563] While the Medici Effect characterizes the intersection, Johnson's adjacency goes into detail about what is actually happening at the intersection of diverse concepts. The Upstream Model fosters adjacency by ensuring the diverse levels of theory are pulled together into a coherent whole.

Third, various methods are appearing that help to structure, and institutionalize, the intersection. One such technique is in a forthcoming book simply called "DOTS" from innovation guru, Hintendra Patel. This approach to innovation leverages four key components: trends, needs, models, and combined capabilities. Trends represent phenomena that can be harnessed for advantage. Needs reveal niches that need new ideas. Models can be tailored to apprehend new value with new approaches. And combining capabilities—like instruments of power—can result in new synergies. Dr. Patel's organization—The IXL Center—has institutionalized this

[563] Steve Johnson, *Where Good Ideas Come From: The Natural History of Innovation* (New York: Riverhead Books, 2010), 31, 35. Johnson describes seven things happening at the intersection of ideas: adjacency ("adjacent possible"), the role of networks, collisions of slow hunches that have brewed for a long time, serendipity, trial and error, borrowing from entirely different fields (exaptation), and building upon discoveries ("platforms").

approach with courseware, certifications, templates, books, and software. The relevance of innovation methods like "DOTS" is the implication of how to foster concept innovation in our ways (not just means). Organizations like DoD can build "the intersection." On a smaller scale, this intersection is what John Warden called "open planning method"— an open clash of ideas that was structured beyond common brainstorming. The Upstream Model could serve as a natural framework from which to transfer the content of innovation theory to military strategy.

In sum, these three examples from innovation theory indicate how the Upstream Model can serve as a natural bridge to these innovation subjects. This research depicts "the intersection" in two case studies where the levels represent adjacency, and "dots" can be connected *within and between* levels to form new and compelling theories of action (see figure 16). The Upstream Model captures some aspects of how concept innovation works and can serve as a framework-bridge between the subjects of innovation theory and strategy making.

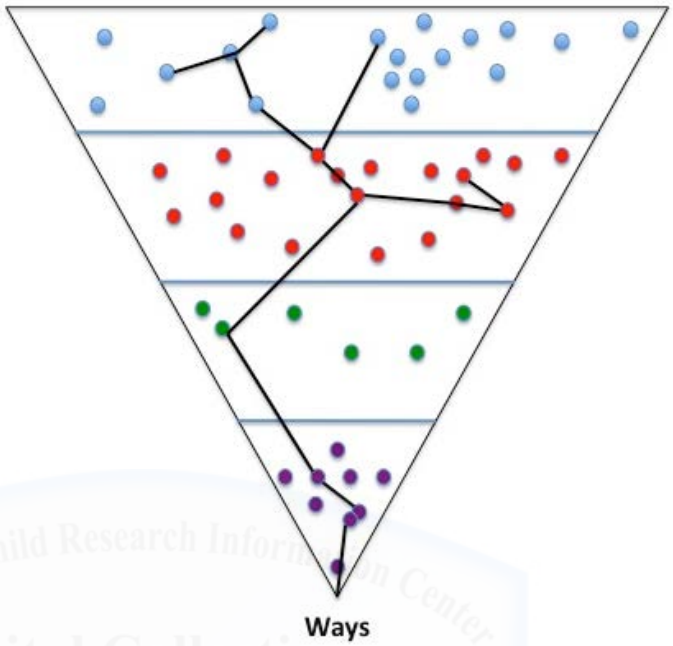

Figure 15: Concepts as Dots Connecting Within and Between

Such a bridge could support training strategists in the art of innovation as well as the art of strategy making. Combining innovation and strategy could provide a source of asymmetric advantage over our enemies by ensuring we begin strategy with superior and unpredictable theory. There is an interesting story in aviation history about how innovation methods per se led to advantage albeit, in this case, pertaining to a material means instead of new "ways" in strategy.

Walter G. Vincenti is a Professor Emeritus of Aeronautical and Aerospace Engineering at Stanford University.[564] At the age of 73, Mr. Vincenti published a lesser-

[564] For more information on Vincenti see http://soe.stanford.edu/research/layout.php?sunetid=sts (accessed 24 Jan 2011).

known classic called *What Engineers Know and How They Know It*. The reflections in this book were written after full careers in aerospace engineering, the history of technology, and instructing. Vincenti uses five aeronautical case studies for evidence in this book that come from the first half of the 20th century, 1908-1953. During this period, the author worked at the National Advisory Committee for Aeronautics (NACA) from 1940 to 1957[565]--overlapping there with Orville Wright.[566] During this era, other authors began to refute the view of engineering as "only applied science."[567] In that context, Vincenti's five case studies indirectly supported this newer discourse about engineering as a knowledge-generating discipline in its own right.

Vincenti describes a model for knowledge growth called the variation-selection model. At all levels of design hierarchy, growth of knowledge acts to increase the complexity and power of what the "variation-selection process." This process highlights the vast variation of all possible designs and the complexity of selecting among them to advance technology. Vincenti noted how variation and selection add two unchanging principles for the advancement of technology: *blindness* to all possible variations and *unsureness* of selection among them.[568]

Vincenti concludes that blindness to the vast potential in variations of design does not imply a random or unpremeditated search. He describes how a blind person in an unfamiliar alleyway uses a cane to provide information to explore the constraints in an intentional way without having any idea where the alleyway leads.

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[565] See http://www.americanheritage.com/articles/magazine/it/1997/3/1997_3_20.shtml, (accessed 23 Jan 2011).
[566] Walter G. Vincenti, personal conversation, January 23, 2011.
[567] Wiebe E. Bijker, Thomas Parke Hughes, and T. J. Pinch, *The Social Construction of Technological Systems: New Directions in the Sociology and History of Technology* (Cambridge, MA: MIT Press, 1987), 69.
[568] Walter G. Vincenti, *What Engineers Know and How They Know It: Analytical Studies from Aeronautical History*, (Baltimore: Johns Hopkins University Press, 1990), 249.

Likewise, engineers proceed in design "blindly" in the sense that "the outcome is not completely foreseeable" thus the "best" potential variations are in some degree invisible.[569] As a result, finding high functioning designs is not the norm. He notes, "from the outside or in retrospect, the entire process tends to seem more ordered and intentional—less blind—than it usually is."[570]

Turning to a technique in concept innovation, Vincenti uses the differences between the Wright brothers and the French inventors to show there is a range in *how* we manage blindness to variations. The Wright brothers designed a flying machine before the French even though they started experimenting at roughly the same time. The French:

1. appealed to what little was known about the Wrights/Langley
2. used mental imaginings of what might succeed
3. included guidance from growing flight experience

But "since [#1 and #3] were meager, however, the level of blindness, at least at first, was well nigh total."[571]

What was the difference in the process between the Wrights and the French?

The French trial and error process had, what Vincenti calls, less theoretical analysis (or new engineering knowledge). Since, "the French were not inclined toward theoretical analysis, variations could be selected for retention and refinement only by trails in flight."[572] For the Wrights, advancement of basic principles in theory via analysis lent to precise shortcuts to direct trials making the French process appear more exploratory in retrospect. Thus, the process of selection is aided by 1) theoretical

[569] Vincenti, *What Engineers Know and How They Know It*, 243.
[570] Vincenti, *What Engineers Know and How They Know It*, 246.
[571] Vincenti, *What Engineers Know and How They Know It*, 244.
[572] Vincenti, *What Engineers Know and How They Know It*, 244.

analysis and 2) experiments (in, say, wind tunnels) in place of direct trial of actual ("overt") versions in the environment. The growth in knowledge increases the power of vicarious trials in place of actual/direct trials.[573] Thus, even at the dawn of aviation one can see how innovations are favored by those who use better techniques to find them.

[573] Vincenti, *What Engineers Know and How They Know It*, 247.

Teaching Strategy

What framework is currently used to teach the theory-strategy nexus or, how is theory presented to strategists in general? At the heart of this work is thinking about how students and practitioners comprehend the gravitas of tailoring theory from all four levels to leverage the unchanging nature of war while dealing with its ever-changing character. Strategy students face an ocean of potential readings without begin sure how they all pertain to strategy making. Such a teaching framework would explain why sources as diverse as Carl von Clausewitz, Thomas Kuhn, and Alexander George are all relevant for study. The National War College and SAASS, for example, provide an impressive array of readings in theory. Yet students enter those programs of instruction without a framework to show how each book fits into the strategy design process. The Upstream Model may be one way to organize the diverse realm of theory into an overall framework that provides students with a mental map to its relevance (see Appendix 4, Theory Content in a Notional Strategy Education Framework).

Strategy students are drawn to the seemingly mystical power of ideas. However, that attraction does not always translate into a passion for the study of theory. Can this be attributed, in part, to the vagueness of the theory-strategy nexus? Perhaps a model can be used to help bridge the passion for ideas with a related passion for the study of theory. The two should be the same. Often they are not.

Further, strategy instruction sometimes lacks a simple way to explain how to apply Clausewitz's idea of "transfer value and change" or, the blending of timeless and timely concepts. The alchemy of "transfer value and change" seems to be critical in the case studies but doing so without a framework is not easy. Thomas Kuhn called this "the

essential tension" between traditional science (old theory) and revolutionary science (new theory).[574] No one level of theory in the Upstream Model represents an earth-shattering observation. However, in this research no other model was encountered that pulls all levels of theory into a framework for explaining how theory shapes the selection of ways in a given situation, and the importance of hypothesis in doing so.

For presenting theory to students, no source could be found that places many theories of action side-by-side to illustrate how creating them is a routine aspect of the craft. Industrial Web, Morale Effect, Enemy as a System, Crony Attack, the Afghan Model and SOCOM F3EAD model for counter-terrorism all demonstrate how essential it is to create a theory for each context to suit the corresponding character of war. Without this emphasis in education, the critical work of developing theories of action is left to "heroism" at best and chance at worst. Once the real-world significance of theory is clarified, students have a better guide than reason alone when facing complex strategy situations.

In closing, expensive technological resources have underwritten American military strategies in the past half-century. Since American capabilities have been superior to those of most enemies, American strategic culture also drifted toward a means-dominance approach. Russell Weigley explained this tendency as "out-massing" enemies.[575] More contemporarily, Peter Singer captures our means-dominance as "out-teching" enemies.[576] Yet both mass and technological advantages are costly. Sharply

[574] Thomas S. Kuhn, *The Essential Tension: Selected Studies in Scientific Tradition and Change* (Chicago: University of Chicago Press, 1977), 226-227.
[575] For more information see Russell Frank Weigley, *The American Way of War: A History of United States Military Strategy and Policy* (Bloomington: Indiana University Press, 1977).
[576] For more information see P. W. Singer, *Wired for War: The Robotics Revolution and Conflict in the Twenty-First Century* (New York: Penguin Press, 2009).

declining budgets could present credibility issues if the United States cannot afford its two normative stratagems for winning wars in the future.

The expanding difference between national ends and means will demand--now more than ever--that America's *ways* account for the difference. September 11th 2001 presented a painful lesson. The scope of destruction on that day revealed that the United States might have built its strategic culture on sand if determined enemies will simply avoid American technological strengths. The nation's enemies are building strategies outside of predictable patterns. To defeat them, a structured approach to concept innovation in strategy development offers a better chance of matching them at their game.

The simplified Upstream Model can give strategists a structure for selecting ways that, if rigorously applied, significantly heighten the prospects that the most innovative ways—with the greatest chance of achieving desired results—come to the fore independent of which strategy method is chosen. It is time to make a comprehensive theory-based framework the standard for evaluating and crafting ways in strategy rather than leave the arduous journey "upstream" to chance.

Sometimes we call things hard if we do not do them well, when actually we do not know how to do them. Strategic creativity seems to be this kind of black-box. Yet the strategists studied in this research provide inspiration for strategy creativity through tailoring theory to each strategic situation.

Our resources are declining and may continue to do so but this does not mean that our ways must decline. We can shock aggressors with our minds and ways more than our things and means. Routine creativity in ways can lead to effective strategies that will bring just and creative theories of action to life even if we are in an age of long term

declining budgets. Our enemies must know that, whatever budgets are passed by Congress or debt is chosen by our leaders, they will face a martial core capable of producing ways-dominant strategies that will be beyond anything they could counter or even imagine in their paradigm-laden minds. No one is invincible. For good ends, there is always a way. And when enemies fear our ways more than our means, we will know that our strategic culture has become its own form of power.

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Appendix 1: Selected Descriptions and Definitions of Strategy

The author is indebted to Lt Col Dave Lyle who began this collection of definitions on a SAASS website for Class XVIIII. The author continued this effort for Class XX, and later categorized definitions, filled in blank sources, added definitions and an etymology of “strategy.”

ETYMOLOGY

"**Strategy**" is derived from the Greek word *stratēgos*, which combines two words: *stratos* (army) and *ago* (leading). *Stratēgos* referred to a 'military commander' during the age of Athenian democracy (Source: The Oxford English Dictionary).

First English definition 1825 (post-Clausewitz, but before his work was translated into English). *Oxford English Dictionary*, vol 10. "The art of bringing one's forces as rapidly as possible to the decisive point." (Source: Martin van Creveld, *Command in War*, 1984, pg 279. Van Creveld writes this as if accounting for a definition found in a 1825 version of the Oxford English Dictionary (OED). [This is not to be confused with dates of historical quotes found in the current OED version that are used to trace the earliest uses of a word like this one below from 1810].

1810. Oxford English Dictionary (modern 1987, 2ed, pg 852). The OED cites a C. James, *Military Dictionary*, 3ed, from 1810. "Strategy differs materially from tactic; the later belonging only to the mechanical movement of bodies, set in motion by the former."

DOCTRINAL DEFINITIONS

JP 1-02 definitions of STRATEGY strategy — A prudent idea or set of ideas for employing the instruments of national power in a synchronized and integrated fashion to achieve theater, national, and/or multinational objectives (accessed 2010).

Strategic level of war — The level of war at which a nation, often as a member of a group of nations, determines national or multinational (alliance or coalition) strategic security, objectives and guidance, and develops and uses national resources to achieve these objectives. Activities at this level establish national and multinational military objectives; sequence initiatives; define limits and assess risks for the use of military and other instruments of national power; develop global plans or theater war plans to achieve those objectives; and provide military forces and other capabilities in accordance with strategic plans. See also operational level of war; tactical level of war.

(JP 3-0) & theater strategy — Concepts and courses of action directed toward securing the objectives of national and multinational policies and strategies through the synchronized and integrated employment of military forces and other instruments of national power. See also national military strategy; national security strategy; strategy (JP 3-0, accessed 2010).

FM 3-0: strategy is defined as “the art and science of developing and employing armed

forces and other instruments of national power in a synchronized fashion to secure national or multinational objectives." (accessed 2010).

AFDD 2-1 *Air Warfare*: Strategy is a means to accomplish an end (accessed 2010).

MCDP 1-2 Campaigning: *Military strategy* is the art and science of employing the armed forces of a nation to secure the objectives of national policy by the application of force or the threat of force. It involves the establishment of military strategic objectives, the allocation of resources, the imposition of conditions on the use of force, and the development of war plans. Strategy is both a product and a process. That is, strategy involves both the creation of plans—specific strategies to deal with specific problems—and the process of implementing them in a dynamic, changing environment. Therefore, strategy requires both detailed planning and energetic adaptation to evolving events (accessed 2010).

AUTHORS

DEFINITIONS IN THE MILITARY CLASSICS

Carl von Clausewitz: Strategy [is] the use of engagements for the object of the war (*On War*, 177).

Antoine-Henry Jomini: Strategy is the art of making war upon the map (*The Art of War*, 62).

Von Moltke the Elder: Strategy is a system of expedients (*Moltke On the Art of War*, 47; as he experienced the new operational level of war).

Von Moltke the Elder: "the practical adaptation of the means placed at a general's disposal to the attainment of the object in view." (in Liddel Hart, 334).

B.H. Liddell Hart: the art of distributing and applying military means to fulfill the ends of policy" (*Strategy*, 321).

Thomas Schelling: Strategy…is not concerned with the efficient application of force, but with the exploitation of *potential* force. Military Strategy can no longer be thought of as …the science of military victory. It is now equally, if not more, the art of coercion, of in intimidation and deterrence. Military strategy, whether we like it or not, has become the diplomacy of violence.

John Boyd: (briefing note, not necessarily a definition): Penetrate adversary's moral-mental-physical being to dissolve his moral fiber, disorient his mental images, disrupt his operations, and overload his system, as well as subvert, shatter, seize, or otherwise subdue, those moral-mental-physical bastions, connections, or activities that he depends on, in order to destroy internal harmony, produce paralysis, and collapse adversary's will

to resist.

AUTHORS WHO INTRODUCED 'WAYS' INTO THE "ENDS, WAYS, MEANS" MODEL (in the US)

Art Lykke: gave coherent form to a theory of strategy with his articulation of the three-legged stool model of strategy which illustrated that strategy = ends + ways + means and if these were not in balance the assumption of greater risk. In the Lykke proposition (model) the ends are "objectives," the ways are the "concepts" for accomplishing the objectives, and the means are the "resources" for supporting the concepts. The stool tilts if the three legs are not kept in balance. If any leg is too short, the risk is too great and the strategy falls over (*Toward an Understanding of Military Strategy*, 1986, p 3-7).

Richard Chilcoat: The skillful formulation, coordination, and application of ends (objectives), ways (courses of action), and means (supporting resources) to promote and defend the national interest (*Strategic Art*, iii).

AUTHORS WHO USE THEORY DEFINTIONS

Bernard Brodie: "Strategic thinking, or 'theory' if one prefers, is nothing if not pragmatic. Strategy is a 'how to do it' … a guide to accomplishing something and doing it efficiently… Above all, strategic theory is a theory for action" (*War and Politics*, 1973, p.452f).

Barry Posen: A grand strategy is a political-military, means-ends chain, a state's *theory* about how it can best "cause" security for itself." (*The Sources of Military Doctrine*, 1986, 13 (emphasis added); relying on an Edward Mead Earle definition in the *Makers of Modern Strategy*, 1971 ed).

Eliot Cohen: called strategy a "theory of victory" (*Supreme Command*, 2002, p. 33).

Colin Gray: "To plan is to theorize… the practicable looking military solution to a pressing real-world problem is, in a vital sense, a theory". The act of formulating a theory for the necessary action is the heart of what he calls, "creative theorizing" (*The Strategy Bridge*, 2011, p. 241-242).

Hal Brands: Grand strategy is the *intellectual architecture* that lends structure to foreign policy; it is *the logic* that helps states navigate a complex and dangerous world (1, emphasis added)… Grand strategy… is the *theory*, or *logic*, that guides leaders seeking security in a complex and insecure world" (*What is Good Grand Strategy?,* 2013, 3, emphasis added).

FOUR DEFINITIONS THAT EMPHASIZE STRATEGY AS A 'PLAN' OR 'ROADMAP'

ADM J.C. Wylie: A plan of action designed in order to achieve some end: a purpose

together with a system of measures for its accomplishment" (*Military Strategy*, 14).

Dennis Drew and Donald Snow: A plan of action that organizes efforts to achieve an objective" (*Making Twenty-First-Century Strategy*, 13).

Angelo Codevilla and Paul Seabury: Strategy is a fancy word for a roadmap for getting from here to there, from the situation at hand to the situation one wishes to attain. Strategy is the very opposite of abstract thinking. It is the intellectual connection between the things one wants to achieve, the means at hand, and the circumstances (in *War: Ends and Means*).

Richard Betts: Strategy is the essential ingredient for making war either politically effective or morally tenable. It is the link between military means and political ends, the scheme for how to make one produce the other. Strategy is a distinct plan between policy and operations, an idea for connecting the two rather than either of the two themselves
Definition: Plan for using military means to achieve political ends.

DEFINITIONS EMPHASIZING THE DYNAMIC OF TWO WILLS

Andre Beaufre: "the art of the dialectic of two opposing wills using force to resolve their dispute" (*An Introduction to Strategy*, 1963, pg. 22).

Beatrice Heuser: "Strategy is a comprehensive way to try to pursue political ends, including the threat or actual use of force, in a dialectic of wills--there have to be at least two sides to a conflict" (*The Evolution of Strategy*, 2010, pg 27b).

NOTE: In 2005, Everett Dolman discusses the significance of two-wills in strategy (*Pure Strategy*, 25) and in 2008, Harry Yarger also highlights this fundamental (*Strategy and the National Security Professional*, 32). Further, since Clausewitz uses the "dual" metaphor (as in 'spar'), the two-will aspect of strategy was likely a truism to a warrior-practitioner like Clausewitz. If there is any doubt Clausewitz conceived of strategy with a two-wills dynamic, the following quote should clarify. "War, however, is not the action of a living force upon a lifeless mass (total nonresistance would be no war at all) but always the collision of two living forces. The ultimate aim of waging war, as formulated here, must be taken as applying to both sides. Once again, there is interaction…Thus I am not in control: he dictates to me as much as I dictate to him" (*On War*, 77). Finally, as Liddell Hart explains the greatness of the 'indirect approach' he describes its significance "to all problems of the influence of *mind upon mind*" (*Strategy*, xx, italics added).

A DEFINITION THAT REJECTS THE "TWO-WILLS" PERSPECTIVE

W. Chan Kim and Renee Mauborgne: Competition-based thinking leads to "Red Ocean" strategies. Non-competition based "value innovation" strategy "based on the view that market boundaries and industry structure are not given and can be reconstructed by the actions and beliefs of industry players. We call this the reconstructionist view… (where) the strategic aim is to create new best-practice rules by breaking the existing

value-cost trade-off and thereby create a blue ocean" (i.e. a new frontier, think Apple under Steve Jobs) (*Blue Ocean Strategy*, 17-18).

DEFINITIONS THAT EMPHASIZE BROAD SCOPE

Hal Winton: Strategy is the craft of creating a favorable future in large-scale activities of broad scope and significant consequence (personal conversation, current as of Dec 2010).

John Gaddis: the calculated relationship of means to large ends (quoted in Harrison *3D*, p5)

Ross Harrison: True strategy involves figuring ways to build a bridge between small means and large ends, thus converting risk into opportunity (*3D*, 5).

AUTHORS THAT ARGUE THERE ARE "LEVELS" OF STRATEGY

Sir Basil Liddell Hart: distinguished between grand and military strategy. *Grand strategy* is "to coordinate and direct all the resources of a nation, or band of nations, towards the attainment of the political object of the war--the goal defined by fundamental policy." *Military strategy is,* "the art of distributing and applying military means to fulfill the ends of policy" (*Strategy* 4ed, 335)

Dennis Drew and Donald Snow: Drew and Snow recognized five classic levels of strategy (*Making Strategy*, 13-27, examples added).

6. National Security Objectives (National Security Strategy, foreign policy, the Democratic Peace, values in founding docs)
7. Grand Strategy (e.g Containment in the Cold War)
8. Military Strategy (e.g. Europe First, Strategic Attack is ODS)
9. Operational Strategy (e.g. Op Bodyguard surrounding D Day)
10. Battlefield Strategy (e.g. Thermopylae, Teutoberg, Trafalgar)

Colin Gray: Gray also sees five levels but names them differently and adds two caveats (*Modern Strategy*, 21).

1. Vision/Policy
2. Grand Strategy
3. Military Strategy
4. Operations
5. Tactics

- Caveat 1 - the levels are *completely interdependent.* Lower level access to higher-level ways is exemplified (in a negative manner) by General (retired) Krulak's information-age concept of the "strategic corporal." Interdependence between levels emerges when a mistake made by an E-5 on the battlefield is negatively amplified across the world with grand strategy effects in the information age like Abu Ghraib in Iraq.

- Caveat 2 - viewing the levels vertically leads to an "inevitable implication of a descent from matters of greater to lesser importance, [which] can conceal the interdependencies that give integrity to the whole" (21).

H. Richard Yarger: strategy is hierarchical. The political leadership ensures and maintains its control and influence over the instruments of power through the hierarchical nature of state strategy. Strategy cascades from the national level down to the lower levels… for example, the US Army War College, in consonance with Joint Pub 1-02, defines the levels of strategy as it pertains to the military element of power within the state as:

1. Grand Strategy
2. National Security Strategy
3. National Military Strategy
4. Theater Strategy

(*Strategy and the National Security Professional*, 21).

NOTE: the central debate for purists is 'strategy' can not exist at the operational or tactical levels war. Others rely on the observation that even at battlefield level of war, leaders must still develop a theory of how to win—a strategy—at such lower levels of organization.

COLIN GRAY DEFINITIONS

Colin Gray: I choose to define (military) strategy as *the direction and use that is made of force and the threat of force for the ends of policy* (*Teaching 21st Strategy*).

Colin Gray: Strategy is the bridge that relates military power to political purpose; it is neither military power *per se* or political purpose. By strategy I mean *the use that is made of the threat of force for the ends of policy*. …strategy is neither policy nor armed combat; rather it is the bridge between them *Modern Strategy*, 17).

Colin Gray: Regarded narrowly in its military dimension, it is the bridge that connects the worlds of policy and military power. It is strategy that interprets the meaning of that power to serve the purposes of policy (*Fighting Talk*: *Twenty Maxims on War and Strategy*).

Colin Gray: Strategy is a constant dialectic between means and ends (*War, Peace, and Victory*).

OTHER NOTABLE DEFINITIONS

Andrew Krepinevich and Barry Watts: Strategy is fundamentally about identifying or creating asymmetric advantages that can be exploited to help achieve one's ultimate objectives despite resource and other constraints, most importantly the opposing efforts of adversaries or competitors and the inherent unpredictability of strategic outcomes

(*Regaining*, p19; used by Ross Harrison and National War College 2015).

Richard Rumelt: Strategy is about *how* an organization will move forward. Doing strategy is figuring out how to advance the organization's interests… a good strategy has an essential logical structure that I call the *kernel*. The kernel of a strategy contains three elements: a diagnosis, a guiding policy, and coherent action (*Good Strategy Bad Strategy*, p 6-7). Others from Rumelt: Strategy…

1. is discovering the critical factors in a situation and designing *a way* of coordinating and focusing actions to deal with those factors (2, emphasis added)
2. is responsive to innovation and ambition, selects the path, identifying how, why, and where leadership and determination are to be applied (6)
3. is coherent action backed up by an argument, an effective mixture of thought and action with a basic underlying structure I call the kernel (77)
4. is in the end, a hypothesis about what will work. Not a wild theory, but an educated judgment (243)
5. is like a scientific hypothesis, an educated prediction of how the world works (247)
6. is an internally consistent argument that leads from facts on the ground to diagnosis, thence to an overall directive, thence to action (269)

Edward Luttwak: The realm of strategy, which encompasses the conduct and consequences of human relations in the context of actual or possible armed conflict.

Gabriel Marcella and Steven Fought: Strategy is the art of applying power to achieve objectives, within the limits imposed by policy ("Teaching Strategy in the 21st Century," *Joint Forces Quarterly*, 1st Quarter 2009).

Williamson Murray and Mark Grimsley: Strategy is a process, a constant adaptation to shifting conditions and circumstances in a world where chance, uncertainty, and ambiguity dominate (*The Making of Strategy*).

Henry Eccles: the comprehensive direction of power to control situations and areas in order to attain objectives" (source poss 1979, Naval War College Review).

Jack Kem: Simply put, *strategy is the art and science of applying the resources of a nation to the interests and goals of that nation*. This requires the integration of the ends (the purposes or objectives of a nation), the ways (courses of action), and the means (the resources of the nation) (in *Campaign Planning, Tools of the Trade*).

H. Richard Yarger: Strategy is the pursuit, protection, or advancement of these interests through the application of the instruments of power. Strategy is fundamentally a choice; it reflects a preference for a future state or condition. Strategy is all about *how* (way or concept) leadership will use the *power* (means or resources) available to the state to exercise control over sets of circumstances and geographic locations to achieve *objectives* (ends) that support state interests. Strategy provides direction for the coercive

or persuasive use of this power to achieve specified objectives. This direction is by nature proactive. It seeks to control the environment as opposed to reacting to it. Strategy is not crisis management (in "*Towards A Theory of Strategy: Art Lykke and the Army War College Strategy Model*").

H. Richard Yarger: the art and science of developing and using the political, economic, socio-psychological, and military powers of the state in accordance with policy guidance to create effects and set conditions that protect or advance national interests relative to other states, actors, or circumstances (*Strategy and the National Security Professional,* 4).

Alan Stephens and Nicola Baker from *Making Sense of War*: Strategy is best described as the bridge between policy and operations; that is, as a plan for the employment of military forces in pursuit of political objectives.

David Lonsdale in Understanding Modern Warfare: The art of using military force against an intelligent foe(s) towards the attainment of policy objectives.

Carl Builder: Strategy is a *concept* for relating means and ends (*The Icarus Syndrome,* p 206, emphasis added).

Mark Clodfelter: "Strategy *is* the ways we use means to achieve ends" (Personal conversation, 2014, emphasis reflected).

Everett Dolman: Strategy is not a thing that can be poked, prodded, and probed. It is an idea, a product of the imagination. It is about the future, and above all it is about change. It is, in a word, alchemy: a method of transmutation from idea into action. **Definition**: a plan for attaining continuing advantage (Pure Strategy, 6).

Richard Betts: Strategy is the essential ingredient for making war either politically effective or morally tenable. It is the link between military means and political ends, the scheme for how to make one produce the other. Strategy is a distinct plan between policy and operations, an idea for connecting the two rather than either of the two themselves **Definition**: Plan for using military means to achieve political ends.

Dictionary.com: the science or art of combining and employing the means of war in planning and directing large military movements and operations. Strategy is the utilization, during both peace and war, of all of a nation's forces, through large-scale, long-range planning and development, to ensure security or victory.

Appendix 2: An Airpower Concept Timeline from the Dawn of Aviation to 1945

This airpower concept timeline was developed during, and for, SAASS Class XX. It was designed to provide an international context to the development of airpower concepts from the dawn of aviation to the delivery of atomic weapons at the end World War II. A complete bibliography appears at the end of the timeline. The abbreviated in-line citations refer back to those sources. The author is indebted to critical reviews from Dr. Richard Muller from SAASS. When his name appears below, the source is personal conversations in 2011. Finally, a few abbreviations below support brevity in the concept descriptions throughout the timeline.

Abbreviations:

- Three categories of airpower fires:
  - CAS – fires for support of troops (*in* the fight)
  - AI – fires interdicting fielded military potential (*on the way* to the fight)
  - ATK – fires for strategic attack at the source of vital centers (*before* the fight); typically, equivalent to "strategic bombing"
- A-A – air to air warfare
- A-G – air to ground warfare
- S-S – surface to surface fires
- A.S. – air superiority
- O – offense
- D – defense
- Blue – friendly
- Red – enemy
- BL - bottomline

1670 Italy. Jesuit Francesco Lana, two chapters on viability of "Aerial Ship".
- First bombing ships envisioned (Biddle, 12).

1783 France. Jacques Charles. Science and technological promise (Biddle, 12).
- Prints of great flying ships dropping deadly ordinance.

1790s France. First military aviation units (balloon companies) (Muller).

1794 France. Battle of Fleurus.
- First aerial recon contribution to victory (Olsen, 239).

1842 UK. Tennyson poem Locksley Hall, "from the nations y airy navies grappling in the central blue" (Biddle, 12).

1843 UK. Samuel Alfred, inventor. Balloon called "the long range" (Biddle, 12).

1849 Austria. Bombs Venice. Becomes first city bombed (Biddle, 19).

1863 UK. Coxwell. "Ghastly dew" of balloons dropping chemical agents.
- First vision of WMD from the air (Biddle, 12).

1886 France. Jules Verne's, *Clipper of the Clouds*.
- The future belongs to aerial warfare machines.

1893 UK. Maj Fullerton. Engineer. Anticipates aerial revolution (Biddle, 13).

1899 Germany. Zeppelin production begins.

12/1903 USA. First successful airplane (Jakab, 202-213).

1908 UK. H.G. Wells' *The War in the Air* (Biddle, 13).
- The concept of airplane warfare grows among visionaries.

1911 Italy. Italo-Turk War.
- First bombs dropped from heavier-than-air-craft.

1912 Italy. Douhet's, *Rules for the Use of Airplanes in War*.
- Among the first doctrines for air warfare (Tillman, 9).
- Incorporates lessons from the Italo-Turk War.

1912 UK. Need for aerial strength recognized in press/public (Biddle, 19).

1912 France and Germany. Organized bombing trials (Kennett, 45).

4/1912 UK. Independent Air Force, Royal Flying Corps (Kennett, 20).

1912 Japan. Kaneko letter to Yamamoto (Peattie, 11).
- Planes can *combine* with torpedo boats to attack harbors.
- This is a sign of combined arms warfare to come (like AirSea Battle in this case).

1912 UK, France, Germany. Navy air services begin.
- Small naval air arms start.
- Italy and the USA begin one year later in 1913.

1913 France. Sensever, Baillif. *The Aerial Combat* (Kennett, 63).
- First call to prep for air battle before fighters are created.

1914 Germany. High altitude photography matured (Kennett, 37).

1914 UK. Mishap investigations and safety culture mature.

- Formal flight safety with lessons learned begins at the Central Flying School (Kennett, 102).
- Even the Wrights had an intense lessons learned program; the distinction here was institutional mishap investigation.

4/1914 France. Independent Air Force.
- *Direction de l'Aeronautique Miltaire* (Kennett, 20).

9/1914. Europe. Aerial observation affects the outcome of battles (Muller).
- Tannenberg
- First Marne

12/1914 UK. RNAS. Emergence of deep AI from the naval air arm.
- Long-range pre-emptive strikes on Zeppelin sheds (Biddle, 21).
- Not enough to stop Zeppelin raid of 1/1915 (Biddle, 21).
- Like Japan, natural for Navy to think internationally/go-long.

1/1915 Japan. Nakajima memo (Peattie, 11).
- The airplane is destined to be the decisive weapon.

1/1915 Italy. Independent Air Force (Kennett, 20).

4/1915 France. Garros. Machine gun mounted A-A kills (Kennett, 151).
- Concepts of air superiority (A.S.) fighting began leading up to Verdun where A-A occurred in earnest.

1915 Germany. Synchronized machine gun leads to "Fokker Scourge" (Kennett, 110).

1915 Germany. Zeppelin ATK raids over London (Wakelam, 12).

1915 Germany/UK. Evidence of unit/aircraft specialization (Kennett, 86).
- Ger "Working units" = CAS
- Ger "Combat units" = air superiority, reconnaissance
- UK "Corps Wing" = reconnaissance
- UK "Army Wing" = fighters and bombers

1916 World. Verdun. First large scale air battles (Horne, 199).
- The fighter arm was borne at Verdun (Kennett, 73).
- Germany. First centrally directed tactical employment of the air weapon with systematic utilization (Kennett, 89b).
- Aerial death became a normal part of aviation existence (Kennett, 148).
- Italy. Salute the sight of falling enemy aircraft saying, "you today, me tomorrow".

1916 Germany. Maintenance (*monteure*) revelation (Kennett, 107).

- Not only flying, "our very lives are always in their hands."

3/1917 UK. Trenchard's RFC manual "Fighting in the Air" (Biddle, 77).

- The morale effect is greater than the material effect.
- The airplane can affect *not just armies but societies*.
- In theory, this is a nascent beginning of strategic bombing.
- Six months later, Tiverton will make this clear in the UK.

5/1917 Gotha/Giant raids begin over London (Biddle, 29).

8/1917 UK. The Smuts Memo justifies RAF and proposes categories (MacIssac, 4-5).

- Observation
- Attack
- Strategic
- Air defense

9/1917 UK. Tiverton (Biddle, 38).

- Selective targeting of vital centers as a strategic element begins as a theory with Tiverton.
- These ideas are appropriated by Gorell and pass through Sherman to ACTS (Biddle, 141) in 1926.
- *Material effect* of Tiverton will be juxtaposed by the *morale effect* of Trenchard in UK concepts. Harris will try to blend the two ideas in 1942 but capes only support area bombing, thus the morale effect logic dominates until 1944.

12/1917 France. Air Service "Note". IDs four kinds of bombing (Kennett, 54).

1. Battlefield Bombing (CAS)
2. Distant Bombing (AI)
3. Industrial Bombing (ATK)
4. Reprisal Bombing (an early form of deterrence).
5. Note: this is an early form of all four A-G bombing categories we fly today: CAS, AI, ATK and strategic deterrence.

1917 UK. Early air defense system for Zeppelin raids (Bungay, 47).

- By 1940 this became an *integrated* air defense system.
- Robust elements of C2: EW, pairing, problem solving.

1918 Japan. Isobe's, *War in the Air* (Peattie, 11).

- Technically the first airpower manifesto.
- Nations who dominate air could also dominate land & sea.

1/1918 Germany. *The Attack in Trench Warfare* (Corum, 36).

- Perhaps the first CAS doctrine (think JP 3-09.3).
- Followed by a series of TTP refinements called "Tactical Guidelines" (Corum, 37).
- Airpower *integrated* into storm trooper ground attack.
- This is an early vision of combined arms warfare.

4/1918 UK. RFC merges with RNAS to become the RAF (Kennett, 92).

- Pre-WWII, RNAS broke back out as Fleet Air Arm due to interwar neglect from the RAF (Dr. Muller).
- Strategic bombing was Trenchard's justification for maintaining air force independence (Corum, 92b).
- Trenchard (morale-effect theorist) is the first Chief of Staff for the RAF (Neville Jones, 16).

5/1918 UK. Newell's, "The Scientific & Methodical Attack of Vital Industries."

- After 41st Wing reprisal bombing vs. Germany (Biddle, 35).
- Call for "larger scale long-range bombing". Initiates three timeless themes that will be repeated forward (Biddle, 36):
  - Hopeful about sustained selective targeting
  - Bombing has a morale effect even if no material damage is done
  - Extrapolate small results to undemonstrated large scale results

7/1918 UK. Trenchard (Biddle, 41).

- Airpower must be relentlessly offensive (Biddle, 28, 77).
- The aim of victory is enemy morale or will (Biddle, 73).
- Area bombing as a strategic element to disperse enemy defenses (Biddle, 41) and also impede production (72).
- This in turn tips their scales to D and ours to O (Biddle, 73).
- Very early ATK mindset, "army policy is to defeat the enemy army—ours is to defeat the *enemy nation*" (Corum, 92).
- CRAF years: best known for focusing on morale effect via city bombing as a strategic element to destroy enemy will and production through vital center ATK (Biddle, 94).
- Area bombing introduces moral dilemmas that remain.
- Foresaw need for fighter escort & bomber self-D (Biddle, 70).

1918 USA. The Gorrell Report on WWI airpower (Corum, 89).

- Shared Tiverton's belief in the power of destroying enemy industry.
- Proposed improvements to UK strategic bombing methods.
- Called for tighter formations and *more precision*.
- Impressed by:

- Indirect effects of bombing
- Loss of production
- The enemy cost of being forced to create air defense
- The general diversion of resources from O to D.

1919 UK. Concept of "air control" or air policing of colonies (Biddle, 82).

12/1919 Germany. Von Seeckt's intense lessons learned process (Corum, 59).

- Need dedicated CAS (60).
- Critical thought regarding squadron and wing structure.
- Airpower needs unity of command for optimization (61).
- Fighters are killing our bombers: *they don't always get through*.
- Interdiction priority on LOCs and supply (62).
- Aircraft obsolescence problem articulated.
- We cannot kill our stock of skilled pilots.
- In general, we must now plan for AAA and air defense (63).
- The C2 system was overloaded; it must scale to the fight.

1920 Russia. Tukhachevskii. *The Battle of the Bugs* (Simpkins, 85).

- Denounced folly of attempting to defeat an enemy by aiming at his morale as "pernicious military idealism".

1920 Japan-UK-USA. Three nations possess aircraft carriers (Peattie, 21).

1921 Germany. 1921 Doctrine. Codifies airpower as offensive (Corum, 64).

- Primary objective: the battle for air superiority.
- Importance of battle groups.
- Importance of ground attack aircraft.
- Employing attack aircraft in mass.
- Coordinated attacks on enemy army.
- Resurgence of SB: heavy bombers should attack deep.
  - Enemy rail yards and supply depots: ~ATK.
  - 1919? They had no successful model in WWI so this is a resurgence (Corum, 74).

1921 Italy. Douhet's, *The Command of the Air*, 1st ed.

- Technically, the second airpower manifesto (post Isobe).
- Contains a Mahanian power-of-the-nation argument.
- New form of war: *everything* can be held at risk (9b, 22).
- Airpower alone can win wars.
- Command of the air is required for this (23, 24, 28, 95-98).
- Focus: morale destruction by direct ATK on cities.
- WMD is legitimate.

1922 USA. ACTS. Air Service Tactical School (Biddle, 133).

- 1926 name change with new Air Corps status (Biddle 138).
- Set the "American canon on strategic bombardment" (67).
- "A more systematic analysis of target sets, and a more deliberate, concentrated attempt to destroy one key target after another, would prove beneficial in the prosecution of a program of strategic bombing" (Biddle, 67).
- Largely Tiverton and Mitchell's beliefs combined.

1923 UK-Germany. Fuller. *The Foundations of the Science of War*.

- Proponent of morale offensive; denounced by Tukhachevskii for this focus in 1931 (Tukhachevskii, 126).

2/1923 Japan. First carrier landing (Peattie, 24).

6/1923 USA. First air refueling. Range increases.

- Range enabled strategies will expand with range capes.
- Spaatz set endurance record at 150 hours in 1929.

1925 USA. Mitchell's, *Winged Defense*.

- The third true airpower manifesto.
- Independence (97) is only way to get offensive air (222).
- Mahanian power-of-the-nation argument (1st preface sentence, 3, 19, 77, 119, 218).
- Now, armies and navies can't exist without air superiority.
- "Airmen" as a stand-alone group devoted to airpower skills.
- Bombing forces get red air up to be destroyed (9).
- Industrial capacity needed to support aviation (24).
- Global reach (4, 26, 38, 126, 130), global power (4, 126).
- Focus: system destruction; ATK in heart of enemy country.

1925 Germany. 1925 Doctrine Pamphlet (Corum, 72).

- Divided their air service into CAS and A.S.
- Codified specialized forms of observation (five types).

1926 USA. Sherman's, *Air Warfare* (Biddle, 140-141).

- This began "industrial fabric" as a codified theory.
- Generally consistent with Tiverton's ATK concept.
- This would come to be the "American" view of ATK at ACTS.
- Note the *systems perspective* and *paralysis* language: "a complex system of interlocking factories… in order to cripple the whole."
- By 1935 in ACTS there is discussion of sympathetic second/third order effects of ATK (Bid, 159).

1926 Germany. 1926 doctrine (Corum, 81).

- *Directives for the Conduct of the Operational Air War*.
- Codifies concept of operational air war (Dr. Muller).
- Laid out a targeting strategy for ATK.
- Blends morale and material ATK concepts.

1927 Italy. Douhet's, *The Command of the Air*, 2nd ed is published.

1928 France. BCR aircraft as first attempt at Douhet's battle plane (Corum, 93).

3/1929 Italy. Mecozzi's *Les Grandi Unita Aviatori* (Corum, 94).

- Opposed to Douhet: airpower is needed for CAS and AI too.
- Recommends organization into three different forces:
  - ATK force
  - Naval AI force
  - Land AI-CAS force
  - An organized vision of separate air services

12/1929 Germany. Borgemann's, "vertical strategic envelopment."

- Use paratroopers behind the lines (Corum, 119).
- A-G strategic concepts of combined arms expand.
- Here, and with Tukhachevskii's "Deep Attack" and "Airmechanization" are the semblances of Blitz Krieg.

1930 USA. Mitchell's, *Skyways*.

- Defeating industrialized enemy means controlling its vital centers (Biddle 136).
- But his vital center definition was basically = cities (including women and children due to their connection to the war economy) (Biddle, 136).

1932 Russia. Tukhachevskii. *New Questions of War* (Simpkins, 135).

- "Airmechanisation" = aircraft in an "all-arms" battle.
- Advocated offensive "deep battle"
- Merged three concepts (Simpkins, 148b):
  - A *process* of the offensive in depth with…
  - *Cooperation* between arms resulting in…
  - Phased *control* of the deep battle.
  - Mirrors a Boyd-like quest for mission command: maximizing the collective capacity of independent action (150).

11/1935 Germany. Wever lecture as new CSAF. Stated five air tasks (Corum, 138).

1. Air superiority by preemptive A-G strikes.

2. AI of enemy supply and movement LOCs.
3. Land CAS and enemy troop AI.
4. Maritime CAS and AI.
5. ATK used "to *paralyze*" an enemy

1935 Germany. Wever-Wilberg, *Luftwaffe Regulation 16* (Corum, 140-144).

- Always in a framework of combined operations (CAS/AI).
- Luftwaffe *also* to carry out independent ATK.
- Thus, ATK on the enemy sources of power (Corum, 143).
- Discuss desired *effects* (morale effect counterprod., 144).
- Conceptual beginning of operational air warfare (Cor, 144).

1936 Russia. Tukhachevskii. *Soviet Field Service Regulations*, Chapt 5 (200).

- Demonstrates clear understanding of strategic attack.
- Articulates attack, pursuit and bomber missions.
- Includes target sets that we'd understand as CAS, AI & ATK.
- Lays out a clear role for C2 aircraft in the battlespace

1936 UK. Slessor's *Air Power and Armies*.

- Goal: AI, CAS, recon, C2 with army to defeat red army (1).
- Also believed in system ATK (3, 16).
- Corbett-like appreciation for protecting *blue* CoGs (202).
- Corbett-like view of air as naturally un-commanded (5).
- Clear apportionment concept "any available margin of air power should be employed on an independent basis for definite, strategic purposes" quoting Sykes (69).
- Blue army supply line too susceptible to air. Need A.S (202).
- Blue system of LOCs needs to diversify due to red AI (204).
- Think on a bigger map; include forward basing (204).
- Many red LOCs? Red army concentration (C) can be delayed by AI (206). One red LOC? C can be prevented (207).
- Air recon and comms key to blue army maneuver (208).
- The further a red army is away from home, the more susceptible it is to AI (209).
- Rail can no longer be the dominant from of army movement (but can be key to economy as we learn in late 1944).
- Primary task is AI (212). Then CAS. Then ATK as able.
- Land and air ops must be "correlated and coordinated" (210) to maximize economy of force for each (212).

1936 UK. Operational Research Section (ORS) begins under Tizard (Wakelam, 29).

- Science and military strategy meld in a unique way.
- The emergence of what we call Federally Funded Research and Development Centers (FFRDCs). Think RAND and DARPA.

1936 Germany. Von Seekt's *Die Truppenfuhrung* (Jablonsky, 168).

- Mission type orders—like "mission command"—to compliment Blitz Krieg

1937 USA. Chennault proposes long-range fighter escort (OCA) (Corum, 98).

Late/1937 UK. "Western Air Plans" (WA) containing AI/ATK elements (Biddle, 178).

- A series of strategic bombing plans.
- W.A. 1 – AI of German air force.
- W.A. 4 – AI of German military LOCs.
- W.A. 5 – ATK of German war industry.

1939 UK. IADS.

- After WWI UK pools air assets in RAF for defense.
- Mitchell has critical IADS thought by 1925 (Mitchell, 199).
- AD becomes a "system" in UK before the Battle of Britain.
- New paradigm: age of electronic warfare begins in earnest.
- Leads to the Dowding System including Chain Home radars.

1940 UK. Dowding System. Functionally complete IADS with EW, intel, C2.

- Battle of Britain. Air can be defeated if they can be found.
- The Dowding System is the first true IADS as we know it.

6/1940 UK. ATK-AI-CAS apportionment dilemmas appear (Biddle, 187).

- Slessor's concept of airpower 'sharing' appears too difficult.
  - Pressuring German economy harder than planned.
  - Bomber Command (BC) diverted to Battle of Britain.
  - BC must help forestall potential attack from sea.
  - CAS was not getting needed results (185b).
  - BL: *everything seemed to need more air* and there was not enough.

8/1941 Allies. AWPD/1.

- The quest for the right ATK target continues.
- This plan centered on the electrical power net but it was not pursued until later in the war.
- Post war, Speer said this would have been better (Biddle, 276).

8/1942 USA. US performs its first strategic bombing run over Rouen, France (MacIssac, 4).

9/1942 Allies. AWPD/42 (Overy, 62).

- "Took account of the mounting tasks"—key airpower apportionment concept takes shape
- At best makes invasion unnecessary; at worst… possible.

1/1943 Allies. Casablanca conference (Biddle, 215).
- Example of commanders intent that is clear but flexible.
- Allows (rightly or wrongly) for both morale and material ATK concepts.
- Combined Bomber Offensive (CBO) basically starts here.

4/1943 US. Japanese strategist Yamamoto is shot down in an A-A kill by 18x P-38s dispatched by Adm Halsey (Griffith, 115).

5/1943 UK. Op Chastise, Dambuster raids.
- An intricate ATK mission without the desired results.
- Floods the Ruhr valley but the Mohne and Eder dams are quickly fixed.

7/1943 USA. FM 100-20. Centralized control codified to improve coord/opt.
- Ike directed Marshall to make this happen (Griffith, 118).

7/1943 UK-USA. Hamburg bombing raises moral questions of morale effects.
- Fundamentally this is questioning the morality of Douhet, Arnold, Norstad and later, LeMay.

8/1943 USA. Schweinfurt/Ball-Bearing Raids (Biddle, 224).
- Failed ATK. 30% of bomber force lost (148 aircraft).
- Results in USA pausing their CBO contributions.
- ATK goal: intel reports ball-bearing factories are an industrial web bottleneck.
- Based on false assumption: bearings cannot be stockpiled.
- They were stockpiled *and* imported from Sweden.
- Internal and external system resilience in an *open system*.
- Kenney's advice on the problem: get air superiority first (Griffith, 143) (then everything is easier).

1944 World. The war-induced, inventive quest for *precision* manifested.
- Precision will change what strategic ideas are possible.
- Butt Report 9/41: 1-in-3 are within 5 miles (Wakelam, 23).
- Harris expressed concern over navigation early in his command, 3/1942 (Wakelam, 92). Innovation amps-up.
- Gee radio navigation (Wakelam, 59), Shaker TTP (62), OBOE radio navigation triangulation (74), PFF (76), H2S ground mapping radar (77), target indicators (77), Mk XIV airborne radar (123), H2X, Norden bomb sights (US).

- "raids… by 1944… successful and precise…to divert resources… of Germany… away from offensive operations" (Wakelam, 6).
- Precision was allowing strategic bombing to reset conditions of the war.

1944 Germany. First operational jet fighter is produced, Me 262.
- Changes speed concepts in airpower.

4-/1944 USA. Bombing synthetic oil refineries & marshalling yards (Biddle, 236-).
- Positive example of ATK that worked; continues into 1945.
- Limits German D (oil) and economy (coal transportation).

6/1944 Germany. V-1 (8,000+ shot) & V-2 (3,000+ shot) rockets began Sept.
- New paradigm: the rocket age and, indirectly, the space age both begin.
- Over 3,000 V-2s shot in these months.
- London and Antwerp strikes were the worst.
- New era of S-S ATK missions begin for non-fleeting targets.
- These are the SCUDs of our wars.

8/1944 Japan. Kamikaze sorties become routine in despair (Griffith, 194).

2/1945 UK-USA. Dresden raises moral dilemma of Morale-Effect Theory (Biddle, 254).

3/1945 USA. Japanese fire bombing (Biddle, 268-269).
- LeMay's logic is an extension of Douhet and Trenchard.
- Logic: if the war is one day shorter, these raids worked (Biddle, 268).
- 66 cities are firebombed.

1945 USA. Hiroshima and Nagasaki atomic bombings (Biddle, 270).
- New paradigm: The nuclear age begins.
- With it, "a new strategic age" begins (Overy, 126).
- Ushers in nuclear era, moral dilemmas, arms races, the Cold war and new deterrence considerations. Still used in enemy strategic communications to demonstrate our barbarism (e.g. Bin Laden before his death).

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Appendix 3: Thomas Schelling's Two Kinds of Coercion

From *Arms and Influence* (1966). Note: numbers in parentheses are page numbers.

COERCION

DISTINCTION	**DETERRENCE**	**COMPELLENCE**
Goal	Deter someone *from starting*; to go on *not* doing something	Compelling someone *to stop*; to change on-going behavior (77)
Result	Inducing *in*action (175)	Inducing *action* (175)
Intention	To deter (78)	To induce withdrawal, acquiescence, collaboration (79)
Difficulty	Easier (100, 174)	Harder (100, 174)
Actions	Held in waiting (77)	Initiated with a time frame (77)
Message	Clear about what is at risk and what it is about (73)	Clear general direction (73); but leaves creative options open
Timing	Indefinite; can wait forever (72)	Definite; deadlines *a must* but with tact—too little and too much time allowed are both bad (72)
Connected-ness to action	Clear (86) with exceptions (88)	Ambiguous (86) with exceptions (88)
Offense & Defense traits	More like coercive "D" but not the same as classic force to resist (78)	More like coercive "O" but not the same as classic force to destroy/take (79)
C.B.A. Quality	[Denying benefits, hold risks]	[Imposing costs, offer punishment]
Posture	A position (73); non-intrusive, non-hostile, non-provocative (directly) (71)	An advance projected as to a destination (73)
Tactics	Announcements, trip wires, incurring obligations, waiting (71)	Requires *more creativity*. *Initiating* an irrevocable action that can cease only if opponent acts (72) without spiraling into self-defeating action (84)
Credibility	Essential (75) but doesn't need to be in motion per se	Essential. Must be *put in motion* to be credible (72)
Interests	Must have some mutual (4)	Must have some mutual
Violence	Latent (3)	Latent [at first]
Ideal	Status quo (77)	Action that once initiated causes min harm if compliance and great harm if not; timetable feasible (89)
Comparison	Statics (71)	Dynamics (71)
Picture	Digging in or laying a minefield and waiting (72)	Get momentum to make the other act to avoid collision (chicken) (72)
Phrases	"Do nothing," "leave us alone," "cooperate." (72b)	"Do something," "go back," "stop where you are."

Appendix 4: Theory Content in a Notional Strategy Education Framework

NOTIONAL STRATEGY EDUCATION FRAMEWORK

ELEMENT:	SKILL	CONTENT	METHODS	PRACTICE
PURPOSE:	Train & sharpen skills	Gain content	Apply skills & content in methods	Practice methods to combine content & skill into coherent strategies
EXAMPLE:	•Critical thinking •Diagnosis •Argumentation •Problem solving •Hypothesis		•Strategy Frameworks: •Scenario planning •Ends/Ways/Means Models •Tretler Cloud •Ascher-Overholt •Design method •Soft systems method •Prometheus	•Practicums: •Exercises •Producing strategies •Case study analysis •Field studies
COURSES:	6000	6200, 6300, 6400, electives	6100	6500 6600